MARINE REVIEW.

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Wonderful Record in Ore.

Official reports of ore shipments from all ports except Escanaba show that shipments of ore by lake during 1897 will exceed 12,100,000 gross tons, or full 2,000,000 tons more than has been shipped in any past season. Rail shipments of probably 200,000 tons will increase the total output of the Lake Superior region to nearly twelve and a half millions. The port of Two Harbors, where the bulk of shipments are from the Minnesota Iron Co.'s mines, leads with an output of 2,650,750 gross tons. Duluth is second with Escanaba, Ashland and Marquette following, these three ports having shipped practically 2,000,000 tons each. In the following table, shipments from Escanaba are estimated on account of a few cargoes still to be moved from that port, but the actual figures in this case will be very close to the estimate:

Ports.	Gross Tons.
Two Harbors	2,650,750
Duluth	2,376,064
Escanaba	2,200,000*
Ashland	2,067,637
Marquette	1,945,519
Superior	531,825
Gladstone	341,014
	12,112,809

*Estimated.

These immense shipments of ore, coupled with the fact that the soft coal movement, which was delayed until the last two months of the season, will be fully equal to that of 1896, go to show the wonderful capacity of the lake fleet when fully employed.

Another Effort to Agree on Freights.

The action of President James Millen of the Lake Carriers' Association in announcing a meeting of the executive committee of that association in Cleveland on the 15th inst., to discuss the question of changing by-laws of the organization so as to permit of the adoption of minimum rates of freight for next season, will very probably result in a great deal of attention being given to this subject at the annual meeting of the association in January. Members of the association who are not on the executive committee but who may find it convenient to be in Cleveland on the 15th are invited to take part in the conference. This meeting is prompted mainly by the action of soft coal shippers in Cleveland, who moved a large part of their coal at low freights this fall through an agreement covering maximum figures to be paid to the several upper-lake ports. The experience of vessel owners in trying to regulate freight rates has been very unsatisfactory in the past, but Mr. A. A. Parker of Detroit and several Cleveland owners are of the opinion that satisfactory results may be obtained from another effort at this time. The question involves so many different interests that there is nothing to be gained from discussion of it until the meeting is held on the 15th. If the meeting is well attended and the big vessel companies are represented, the subject will undoubtedly come up at the annual meeting, but if not it will go by default as in the past.

Medal for Capt. Frank Root.

Attorney James H. Hoyt of Cleveland has taken up the matter of securing a medal from the government for Capt. Frank Root of the Minnesota line steamer Mariposa, who has been so generally commended for his brave act in rescuing two survivors from the lost steamer Idaho, which went down in Lake Erie, off Long point, Nov. 6. Until January last the laws regarding life saving medals were so construed that in a case like that of Capt. Root it would probably be necessary to secure a special act of congress. It was held that the laws applied to life saving crews and to acts of bravery performed in the vicinity of life saving stations. But on Jan. 21, 1897, an act was signed providing that the laws regarding life saving medals shall be construed "so as to empower the secretary of the treasury to bestow such medals upon persons making signal exertions in rescuing and succoring the shipwrecked and saving persons from drowning in the waters over which the United States has jurisdiction, whether the said persons making such exertions were or were not members of a life saving crew, or whether or not such exertions were made in the vicinity of a life saving station."

The regulations of the treasury department provide, of course, that the evidence must be complete and must be set forth in affidavits. The affidavits and other necessary documents in Capt. Root's case are now being prepared by Mr. Hoyt for presentation to the secretary of the treasury.

The proposition of Charles T. Yerkes, Chicago street railway manager, that twenty miles of docks be built on the lake front and the Chicago river transformed into a boulevard by covering it with a culvert from end to end, sounds well on paper, but the corporation of fifty millions capital that he speaks of to undertake such a gigantic project would undoubtedly be slow of formation. Mr. Yerkes says that to rebuild the tunnels under Chicago river to conform to 26 feet navigation, or even 20 feet, would mean an extension of the tunnel approaches several blocks at each end. This would involve the condemnation of property worth millions. But notwithstanding these obstacles it would seem that Chicago is determined upon some big project to overcome the congested condition of the river and its branches, and the Illinois members of congress will be heard from in a most emphatic way at Washington during the winter.

Growth of Lake Commerce.

Mr. E. T. Chamberlain, United States commissioner of navigation, evidently regards the growth of lake commerce as of first importance in affairs of the bureau of navigation. The first two pages of his 1897 report, just at hand, are devoted to figures dealing with ships built and owned on the lakes. He says that we are almost exclusively indebted to the growth of ship building on the great lakes for our increase in tonnage during the past ten years, as is indicated by the following table, showing our total documented tonnage by geographical districts on June 30 of each year designated:

	1897	1887	1877
	Gross tons.	Gross tons.	Gross tons.
Atlantic and gulf coasts	2,647,796	2,847,135	2,944,865
Pacific coast	439,012	334,669	251,556
Total salt water	3,086,808	3,181,804	3,196,421
Great lakes system	1,410,103	733,069	610,160
Western rivers	272,109	356,355	436,018
Total fresh water	1,682,212	1,089,424	1,046,178
Grand total	4,769,020	4,271,228	4,242,599

"The discovery and utilization of the mineral wealth of the great lakes region," says Mr. Chamberlain, "supplemented by timely appropriations by congress for the improvement of navigation, have brought about a maritime growth in that portion of our country which is without parallel in maritime history. Our lake fleet alone is greater than that of any foreign nation except Great Britain or Germany. While our salt-water tonnage, including that engaged in both the foreign and coasting trade, is less in volume than it was twenty years ago, it has been rendered much more efficient in carrying power by the substitution of steam for sail."

The steam tonnage for the periods named was:

	1897	1887	1877
	Gross tons.	Gross tons.	Gross tons.
Atlantic and gulf coasts	1,011,102	773,822	656,316
Pacific coast	195,145	160,556	79,841
Total salt water	1,206,247	934,378	736,157
Great lakes system	977,235	390,398	201,085
Western rivers	175,075	217,942	233,954
Total fresh water	1,152,310	608,340	435,039
Grand total	2,358,557	1,542,718	1,171,196

Division of Naval Reserve Funds.

Members of the naval reserve organizations on the lakes will be interested in the annual report of the operations of the naval militia for the year 1897 recently submitted to Assistant Secretary Roosevelt of the navy department by Lieut. J. H. Gibbons. Mr. Roosevelt's earnest endorsement of this report was referred to in the last issue of the Review. The following table, taken from this report, gives the number of officers and men in the different states, and also shows how $50,000 appropriated by the last congress for arms, accouterments, signal outfits, etc., was apportioned among the several organizations:

State.	Petty officers and enlisted men.	Allotment.	State.	Petty officers and enlisted men.	Allotment.
Massachusetts	434	$5,625.71	Georgia	188	$ 2,436.94
Rhode Island	158	2,048.07	Louisiana	209	2,709.16
Connecticut	135	1,749.93	California	355	4,601.67
New York	367	4,757.22	Illinois	448	5,807.18
New Jersey	337	4,368,35	Michigan	177	2,294.36
Pennsylvania	183	2,372.13	Ohio	174	2,255.47
Maryland	233	3,020.25			
North Carolina	140	1,814.75	Total	3,703	* $48,000.00
South Carolina	165	2,138.81			

*$2,000 was reserved for the publication of books of instruction.

This apportionment was made in accordance with returns from state governors showing the number of petty officers and men in each state provided with uniforms of naval pattern on Jan. 1, 1897. Division is made on the ratio that the number of properly uniformed petty officers and enlisted men in each state bears to the total number returned by all the states.

In view of the increased output from the Norrie mines under Carnegie ownership, the managers of the Chicago & North-Western railway expect to ship 2,000,000 tons of ore from their docks at Ashland next season. Arrangements are nearly consummated for extending the shorter of the two docks 250 feet and raising it about 20 feet higher. This will make the two North-Western docks practically the same length.

STEVENS VALVE GEAR FOR MARINE ENGINES.

ITS ORIGIN AND USE IN THIS COUNTRY.—A VALUABLE CONTRIBUTION TO MARINE ENGINEERING HISTORY FROM THE VENERABLE FRANCIS B. STEVENS.

A paper read at the recent meeting of the American Society of Mechanical Engineers in New York deals with the origin and introduction of the Stevens valve gear for marine engines. It was thought that the venerable Francis B. Stevens would be present at the meeting, and there was general regret upon learning that he was unable to attend. The paper was by Andrew Fletcher of the W. & A. Fletcher Co. "It has been urged upon me" Mr. Fletcher says, "that the transactions of the American Society of Mechanical Engineers should contain some record of the origin and introduction of the form of valve gear for beam engines which has grown to be so general in the side-wheel practice of the marine engine builders of the United States, and of which the firm with which I am connected has been for so many years an advocate. I have thought that this could best be done by getting from Mr. Francis B. Stevens a communication to me in which this history should be included, and which I might illustrate by drawings from more recent practice. Accordingly the communication is appended herewith, and the drawings are self-explanatory. I may be permitted to add that Mr. Stevens is eighty-seven years of age, and is still an enthusiast upon steamers of all kinds. My own connection with his form of valve gear began forty-four years ago, with my first connection with the old firm of Fletcher, Harrison & Co., during twenty-seven years; W. & A. Fletcher for three years; and the W. & A. Fletcher Co., for the past fourteen years." The letter of Mr. Stevens to Mr. Fletcher follows:

My dear Mr. Fletcher:—In answer to your request, I send this letter in relation to the Stevens cut-off. Previous to its introduction in the year 1840, the form of valve and valve gear in almost universal use on the steamboats navigating the rivers and bays of the Atlantic coast was by poppet valves, operated by a single eccentric and a single rock shaft, the admission and exhaust of steam being coincident. Expansion was effected by a butterfly valve on the steam pipe worked by cams on the shaft, which was called the camboard cut-off. On the Mississippi, at the date mentioned, the engines were the same as at present in use, having poppet valves worked by cams on the main shaft.

In the latter part of the year 1839 I invented the Stevens cut-off, and early in the year 1840 I had the machinery for its application on the engine of the steamboat Albany made. This vessel was owned by my father, and the machinery was made by H. R. Dunham & Co., North Moore Street, New York, where you served your apprenticeship. As the work was not finished until after the opening of navigation on the Hudson, I was unable to attach it to the engine until the following August, when the Albany was laid up for repairs at Cold Spring, opposite West Point. And in the interval I had similar machinery of smaller size made by the firm mentioned, and put in operation on the engine of the steamboat Columbus, owned by my uncle, Robert L. Stevens. The engine of the Albany had a cylinder 65 inches in diameter and 9 feet stroke. That of the Columbus was 40 inches diameter by 12 feet stroke. The cut-off as first applied was essentially the same as at present. On the Albany, the length of the toes was 26 inches and the lift of the valves was 5½ inches.

On submitting to my uncle, Robert L. Stevens, my model of the cut-off, made on a scale of 1½ inches to the foot, he proposed an improvement, by substituting a cog wheel for the arm of the rock shaft, by which a greater angular motion of the rock shaft, and consequently a shorter cut-off, could be obtained. We then agreed to take out a patent in our joint names, with the understanding that I was to have complete ownership of the patent. And in April, 1840, I made the drawing that accompanied the patent, a copy of which, on a reduced scale, I annex. The patent was granted on the 25th of January following, the claims being as follows. First—Combination of an additional and separate eccentric wheel to work a rock shaft to raise the steam valves in combination with any of the several methods hitherto used for working the exhaust valves. Second.—The manner in which the toes are affixed to the rock shaft so that the shaft is made to vibrate during a certain interval, without either toe communicating motion to either valve. Third—The connection of the cog wheel and rack in the manner set forth, for the more completely effecting our object. This connection was never used, being found unnecessary. The patent was renewed in 1855 and expired in 1862. Its validity was never attacked, and none of its claims was infringed during the twenty-one years of its existence. Since it expired, separate eccentrics for the steam and exhaust valves have been frequently applied in combination with the Sickels, the Allen and other cut-offs.

In the course of the year 1840 I applied the cut-off to the engines of eight steamboats, namely, the Albany, Columbus, Rochester, De Witt Clinton, Independence, Swan, and two steamboats on the Delaware; and shortly afterwards I sold a half-interest in the patent to my father, James A. Stevens. In the year 1842 the Stevens cut-off was applied to the engine of the United States steamer Fulton the Second, and afterwards to the greater portion of the paddle-wheel vessels of war of the United States navy. In 1845 it was applied to the steam frigate Missouri. The contract for it, made by my father and myself with the navy department, required that the cut-off should be made adjustable while the engines were in motion. To effect this, devices made at the works of H. R. Dunham & Co. were applied to quickly change the angle of the toes, the position of the arm pin, and the lead of the eccentrics. This vessel was the flagship of Commodore Berry's squadron on the famous expedition to Japan in 1853-54. And Mr. Daniel B. Martin, afterwards engineer-in-chief of the United States navy, reported that this adjustable cut-off worked perfectly during the whole cruise, lasting about two years. The cut-off has been made adjustable on river steamers by this and other plans; but the advantage gained has not been considered equivalent to the increased complication of the machinery. Previous to and during the Civil War, the cut-off was on many large ocean steamers.

The advantages gained by the Stevens cut-off over the camboard cut-off were: First, the saving of a portion of the steam in the space between the butterfly valve and the main valves; secondly, the use of two eccentrics allowed the lead of the exhaust valve to be greatly advanced, by which a quicker exhaust was obtained, and also the reversal of the strain on the piston at the end of the stroke was more gradual and with less jar on the bearings. The Stevens patent, whether under the combined first and second claims or under the first claim alone, can be said to have been in universal and exclusive use on all beam-engine paddle-wheel steamboats in the United States since the expiration of the patent thirty-five years ago. Of late years the substitution of the screw, with its quick-moving engine and slide valve, has superseded the paddle and poppet valve on the ocean; and also in great part on the rivers of the Atlantic coast, and on the great lakes. I add the following account of the early use of the expansion of steam and of the valves used on the Atlantic seaboard.

Watt, the creator of the steam engine for uses other than pumping, was the first to conceive the idea of utilizing the expansive action of steam

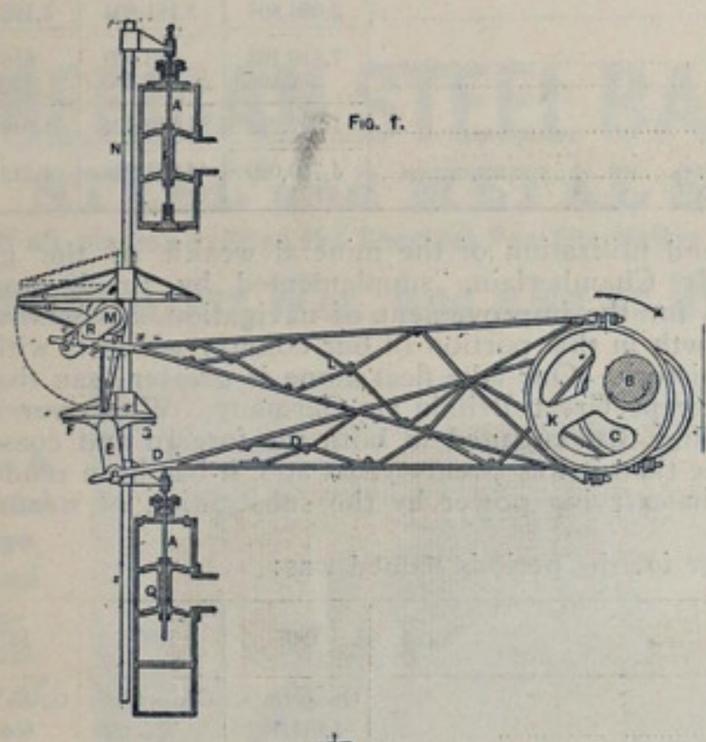


FIG. 1.

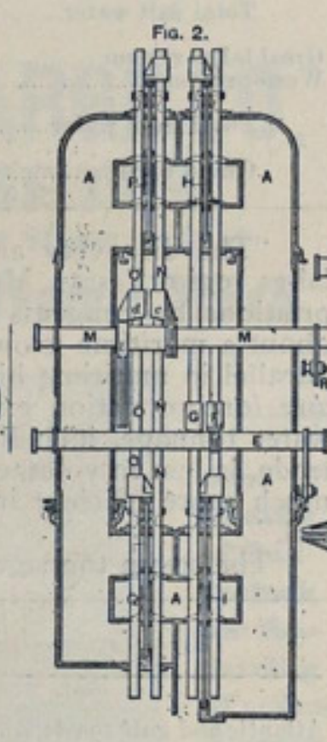


FIG. 2.

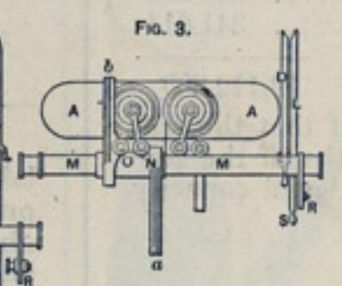


FIG. 3.

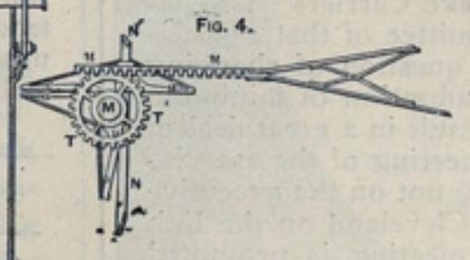


FIG. 4.

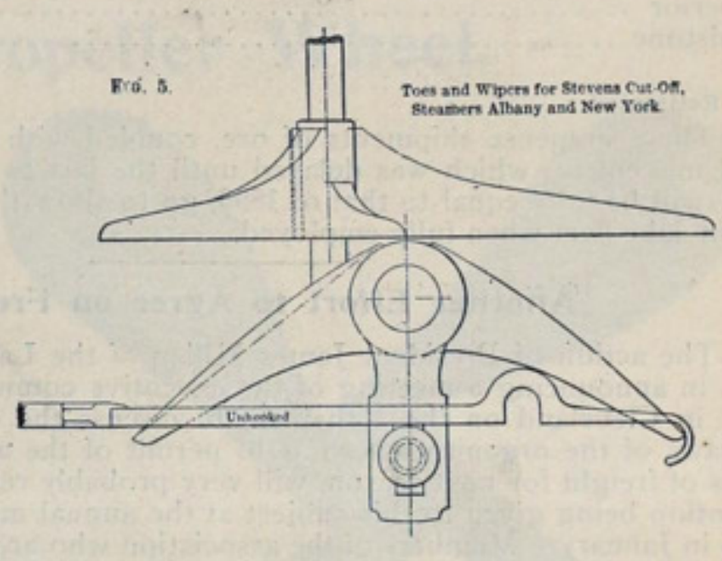


FIG. 5. Toes and Wipers for Stevens Cut-Off, Steamers Albany and New York.

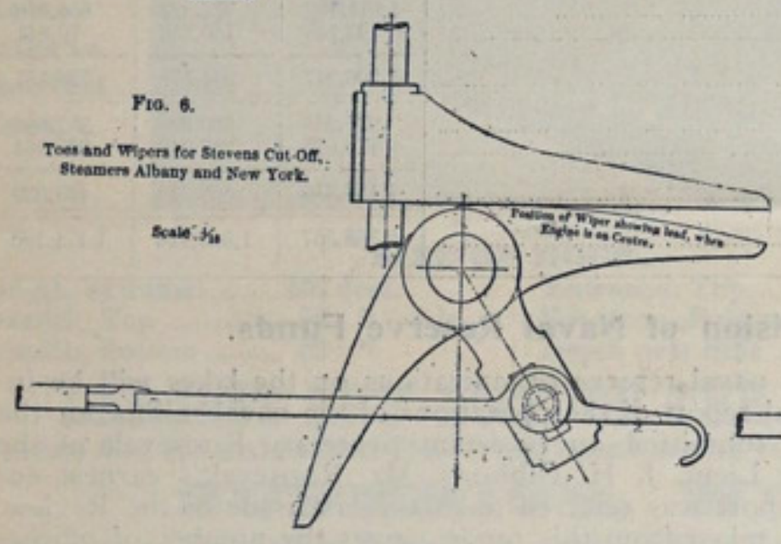


FIG. 6. Toes and Wipers for Stevens Cut-Off, Steamers Albany and New York. Scale ⅜ in.

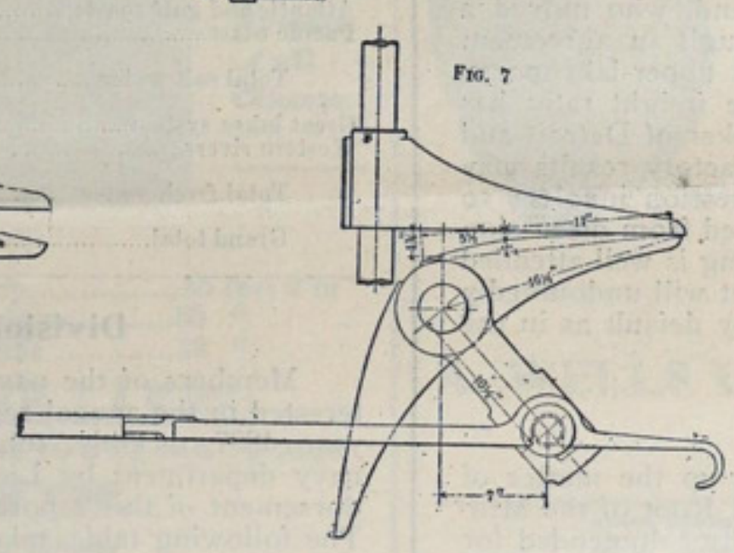


FIG. 7

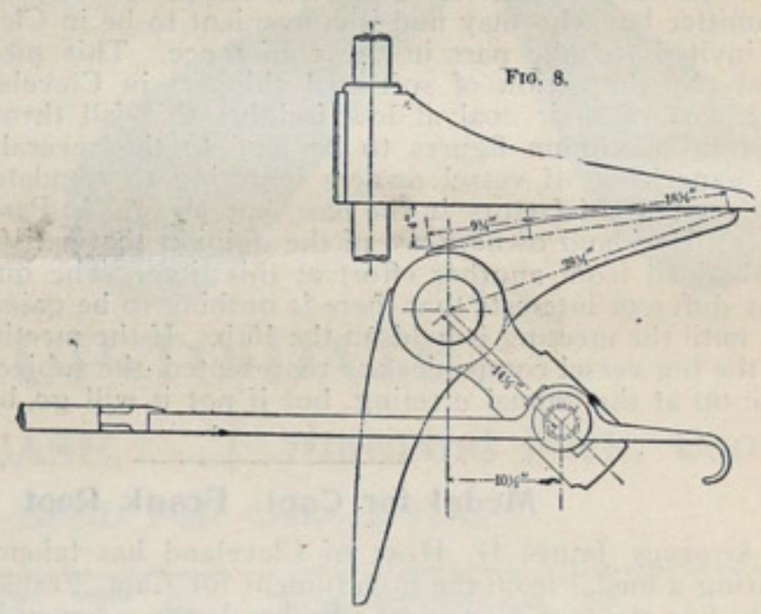


FIG. 8.

in the cylinder when cut off from the boiler, and proposed it in a letter to Dr. Small in 1769 (see Farey's "Treatise on the Steam Engine," London, 1827, page 339). He was also the first to put the idea in operation, which he did at the Shadwell water works in 1778 (Farey, page 341). He patented the application of this principle in his third patent, dated March 12, 1782, and in the specification and drawing clearly and beautifully illustrated by a diagram the principle of expansion (see Farey, page 347). He thereafter applied this principle to all of the single-acting pumping engines that he made, cutting off the steam by the main steam valve, and at from one-half to two-thirds of the stroke of the piston on the downward stroke, the pressure on each side of the piston being in equilibrium on the upward stroke (Farey 352). But although Watt invented and patented the double-acting rotative steam engine in his second patent, dated Oct. 25, 1781, and although he made many of these engines of many different sizes, and was in fact the only maker of them in the world during the long period that elapsed between their introduction and the expiration of his extended patent in the year 1800, he never used steam expansively on a rotative engine (see Farey, note at the foot of page 487). The engine that Fulton bought from Watt in 1805-6, and which he placed on the Clermont in 1807, was operated by Watt's hand gear, as shown on Plate XIII. of Farey's Treatise. It was very ingenious, but complicated, made almost entirely of steel tempered blue, and was operated by tappets and detents. No modification of Watt's hand gear, to enable it to cut off the steam on a rotative engine was ever made by him or by others. The engines of all the numerous vessels that Fulton built were copies of the one he bought from Watt.

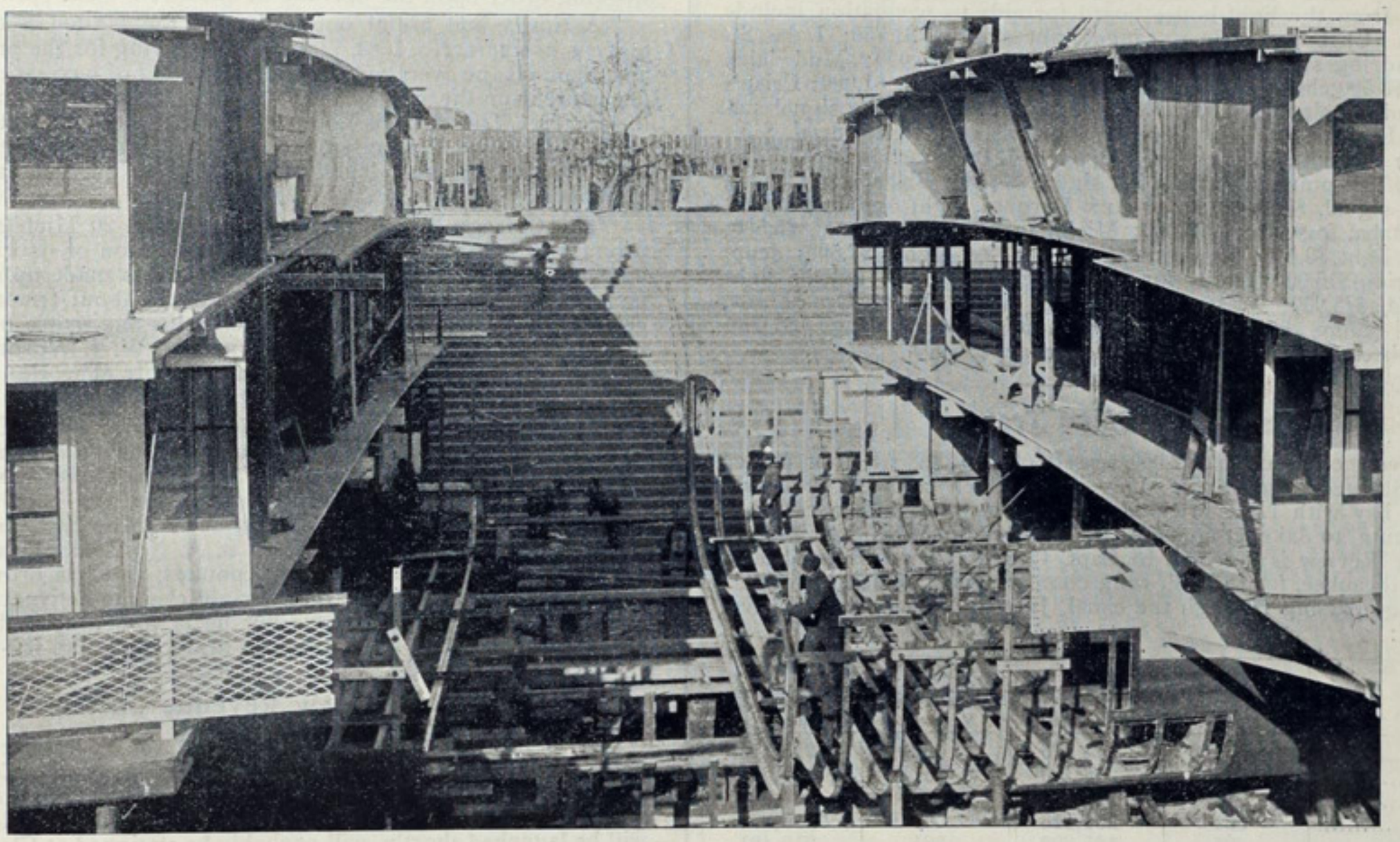
When about eleven years of age I frequently saw the steamboats Fire Fly and Lady Richmond, built by Fulton. Their speed was about four and a half miles an hour. I also frequently saw Watt's hand gear in operation; and remember on one occasion seeing the detents fail and the engine instantly stopped. No lead could be given by the hand gear; and the cranks were carried past the centers by a flywheel. All of Fulton's steamboats had flywheels geared two to one, thus increasing the force of momentum fourfold. In the year 1814 Robert L. Stevens built the steamboat Philadelphia on the Delaware, the engine having Watt's hand gear. And in the year 1817 he invented the camboard cut-off, previously mentioned, and attached it to this engine as a separate cut-off. This was made by a butterfly valve placed on the steam pipe at its junction with the steam chest, and operated by two cams on the main shaft, pressing against the camboard and connected to the butterfly valve, and to a strong spring on its arm by a rod about half an inch diameter. The length of the cut-off corresponded to that of the cams, and the motion was exceedingly rapid. He at the same time increased the pressure from 2½ to 10 pounds per square inch. This cut off was very successful and remained in use on all low-pressure steamboats in this country long after the hand gear of Watt had been superseded by the eccentric of Murdock, and up to the introduction of the Stevens cut-off in 1840.

I also send the following account of the eccentric, deriving its motion from the shaft which superseded the plug tree, tappets, and detents of Watts, and was applicable alike to poppet and slide valves; and also add an account of the slide valve.

These were both patented by William Murdock, the foreman and partner of Watt, in 1799. The D slide is shown on plate XVI. of Farey; and in another form, now generally used, by Fenton, Murray & Co., on plate XVIII. A notable circumstance in regard to the slide valve is that up to the year 1838, although it was then in universal use on the locomotives and marine engines of England, and also on the locomotives of this country, it had only sufficient lap, or cover, as it was then called, to prevent the steam from blowing through the cylinder. The Chevalier De Pambour, in his famous treatise on the English locomotive in 1836, gives a drawing of the valves then in use on them, showing little or no lap; and although he writes very fully on the lead, he makes no mention whatever in his treatise of the lap or of its effect. In the year 1838 the eighteen locomotives of the Camden & Amboy R. R. had one-sixteenth of an inch lap. In the same year the steamer Great Western made her first passage. Her engines had the D slide, with little or no lap, and carrying 2½ pounds pressure per square inch. She had a separate cut-off valve somewhat like the camboard, but it was never used, the low pressure of steam rendering it almost useless. I have not met with an account in any publication, up to the year 1838, describing increased lap either in text or drawings. The link motion was applied to the slide valve about that date. And in conjunction with it, in the course of a few years, the lap was gradually increased to its present extent, both liberating the exhaust in advance of the admission of steam and forming the efficient expansion gear in use on locomotives and screw steamers.

Hoboken, N. J., April 2, 1897. FRANCIS B. STEVENS.

Mr. Fletcher adds the following to the foregoing letter: "Our practice with the Stevens cut-off at the W. & A. Fletcher Co. has included its installation on over two hundred steamers new and old, large and small. We try to find out the amount of work required of the engine, and the necessary steam pressure, and then set the cut-off to suit. With the fixed cut-off, the owner need only notify his engineer of the proper steam pressure, and he runs with his throttle wide open. This plan gives a steadier and more regular running of the boat upon its time-table than will be secured from adjustable cut-off in not too competent hands. Not long since the writer was upon a steamer in New York harbor, for which we had made a new cylinder and front in 1855, and had then applied the Stevens gear. It remains in good working order, and has given no trouble. With very fast running engines, the wipers are made slightly different in shape, and we put springs on the lifting rods so as to force the toes to follow down the wipers. But we have never had any trouble to make the cut-off work satisfactorily. I do not wish to be understood as opposing adjustable cut-off gear. We have made and fitted a large number of engines with Sickels' dash-pot cut-off with adjustable gear with most excellent results. But there are often advantages in having so simple an arrangement as that which increases the speed by increasing the pressure, and which diminishes it, by closing the throttle."



Adding a 30-foot Section to the Hudson River Steamer New York.
(See Marine Review of Dec. 2.)

A graphic illustration of what forced or induced draft is destined to accomplish is shown in a picture of the works of the B. F. Sturtevant Co., Jamaica Plains, Boston. Two chimneys, one tall stack of 60 feet and the other only a few feet in height, appear in the illustration. The small chimney has taken the place of the tall one in the operation of the works. The results obtained—a steady draft and saving of fuel—seem to indicate that the draft apparatus will some day take the place of tall expensive chimneys, and at the same time solve the smoke nuisance difficulty. The Sturtevant company is probably the largest manufacturer of fans and blowers in the world. All the United States war ships and the principal transatlantic liners, as well as a number of lake vessels, are equipped with these machines, the number ranging from one to thirty or forty. Wide spread operations in this special line of engineering has secured to the experts of this company a vast accumulation of practical information on the subject of artificial draft, which is to be found only in such a concern. A book dealing with the results of the company's experience is to be published soon. It will contain about 500 pages, the contents of which would warrant sale at $10 a copy to owners or managers of steam plants. The book is being very carefully prepared. Considerable space is given to plans of draft for marine service.

Estimates on Lake Improvements.

Several congressmen from lake districts who have been interviewed say that there is no truth in the reports of a movement to prevent the passage of a river and harbor bill by the present congress. They are of the opinion that appropriations will be held down to the lowest possible figures but that a river and harbor bill will be passed in addition to the regular appropriations for continuous contracts. Among the estimates for river and harbor improvements submitted by the secretary of the treasury in his great letter of estimates from all departments are the following:

Detroit river, $91,257; Hay lake channel, $494,115; Cleveland, $350,000; Buffalo, $481,250; Black River, Michigan, $32,000; Grand river, Michigan, $250,000; Kalamazoo river, $145,000; Pine river, $5,560; Menonimee river, $5,000; Menonimee harbor, 5,500; Saginaw river, $80,000; Chippewa river, $80,000; Sturgeon Bay and Lake Michigan canal, $63,500; Minnesota river, $11,000; Ashtabula, $480,600; Black River harbor, $38,500; Conneaut, $495,000; Fairport, $250,000; Huron, $75,000; Port Clinton, $15,000; Sandusky, $185,000; Toledo, $300,000; Cheboygan, $10,000; Frankfort, $65,000; Grand Haven, $30,000; Grand Marais (harbor of refuge), $100,000; Holland, $15,000; Belle river, $10,000; Charlevoix and entrance to Pine lake, $25,000; Ludington, $15,000; Manistee, $50,000; Marquette, $100,000; Monroe, $11,000; Muskegon, $110,000; Pentwater, $40,000; Petoskey, $55,000; Portage lake (harbor of refuge), $160,000; Presque Isle, Marquette (harbor of refuge), $30,000; St. Joseph, $100,000; Sand Beach (harbor of refuge), $250,000; Saugatuck, $10,000; South Haven, $45,000; White lake, $48,000; Ashland, $100,000; Green bay, $38,800; Kenosha, $34,000; Milwaukee, $14,000; Milwaukee (harbor of refuge), $155,650; Oconto, $46,710; Racine, $23,953; Sheboygan, $26,600; Two rivers, $19,800; Agate bay, $71,708.

Estimates from the light-house board for aids to navigation include the following. Cheboygan river, range light station, $1,750; Lake St. Clair, light and fog station, $20,000; Middle island, $25,000; Mud lake, light station, $3.500; head of St. Mary's river, range light, $1,000; Crisp's point, light and fog signal, 18,000; Rock of Ages, light and fog signal station, $50,000; Eagle river, light, $20,000; Martin's reef, light vessel, $15,000; depot for eleventh district, $15,000; Grand Traverse, light and fog signal, $5,500; Tail point, light and fog signal, $7,500; Fisherman's shoal, light and fog signal, $50,000; Point Aux Barques, light and fog signal, $32,000; Escanaba, fog signal, $5,000; Michigan City, fog signal, $5,500; Portage lake, light $3,500; Kewaunee light and fog signal $7,500; depot for ninth district, $15,000; tender for ninth district, $85,000; Toledo, light and fog signal, $75,000; Grassy island, range light, $5,000; Grosse isle, north channel range, $3,500; Grosse isle, south channel range, $5,000; depot for tenth district, $35,000; tender for same, $85,000.

Sturgeon Bay Canal Traffic.

During five months of 1897 2,960 vessels of 1,064,868 net tons passed through the Sturgeon Bay canal. This canal, which connects the lower end of Green bay with Lake Michigan, is seldom taken into account in statistics relating to lake commerce, notwithstanding this big item of tonnage. The Review is indebted to Capt. Geo. A. Zinn, United States engineer at Milwaukee, for the following comparative statement of vessels and net tonnage passing through the canal, July to November, inclusive, 1896 and 1897:

	1897.		1896.	
	Number of Vessels.	Net Tonnage.	Number of Vessels.	Net Tonnage.
July	554	214,976	552	215,115
August	703	235,130	487	169,607
September	717	244,754	470	167,091
October	581	204,116	567	210,273
November	405	165,892	531	219,421
Totals	2,960	1,064,868	2,607	981,507

Increase in number of vessels..... 353
Increase in net tonnage..... 83,361

Ships and Naval Heroes.

Fourteen rousing good sea stories of 1812 are included in "Yankee Ships and Yankee Sailors." James Barnes, the author, has written a half dozen books of a similar kind. It is published by the Macmillan Company, New York, and sells for $1.50. Zogbaum furnishes some of the illustrations. The book deals with a condition that will never come again. The sailing ship was in its glory and the officers were considered heroes. Many of them no doubt were entitled to the name. The ordinary seaman receives considerable attention. It would make a nice Christmas present for men engaged in operating lake vessels, and it ought to prove very attractive reading for members of the naval reserve.

Boys who have a liking for the sea and naval heroes will be interested in "Twelve Naval Captains," published recently by Charles Scribner's Sons, New York. It gives the principal events in the lives of such commanders as Paul Jones, Stephen Decatur, Oliver Hazard Perry, and others who served their country on the sea from 1776 to 1815. The accounts of battles are impartial, accepting the statement that no vessel was unworthily given up on either side. The author states in the preface that the youth of the country should realize that a ceaseless whine against England is very un-American.

"Commodore Bainbridge" is a simple but interesting biography in the series of "Young Heroes of Our Navy," published by D. Appleton & Co., New York. The author, James Barnes, is a descendant of the gallant commodore, and on this account had access to letters and documents that would insure the accuracy of the story. The chaper describing the capture of the frigate Philadelphia under his command, at Tripoli, is tragic. The whole book excites as much interest as any novel, and in addition gives a fair history of the naval warfare that the United States had to keep up during the early part of the century to enforce the respect of other nations. The price of the book is $1.00.

Around the Lakes.

H. W. Hubbell & Co., dredging contractors, have purchased the Chicago tug Thomas Hood.

Some 63,000 tons of coal have been received at Two Harbors for the use of the Minnesota Iron Co.'s mines during the winter and for the railway. This relieves all fear of scarcity there.

It is claimed that the side wheel steamer City of Buffalo, going to Detroit for winter repairs, made the run from Cleveland piers to the foot of Woodward avenue, Detroit, in 5 hours and 53 minutes.

The Ship Owners' Dry Dock Co., Cleveland, has in hand, with its new plant for repairing steel ships, quite an extensive job on the steamer La Salle. It involves the repair of damages to twelve plates and about seventy frames.

A dispatch from Chicago announces the death of Capt. Robert Kyle at Rogers Park on the 6th inst. Capt. Kyle quit the lakes some sixteen years ago, but was well known among vessel men. He was seventy-four years old.

A. A. Schantz, general passenger agent of the Detroit & Cleveland Steam Navigation Co., has issued a very clever card noting the closing of navigation on his lines. It is a picture of a roll top desk being closed down over five little boats resting on the blotter. On the desk top is printed "closing up."

Lieut. H. K. Hines, U. S. N., who is to have charge of the new branch hydrographic office at Duluth, will soon spend a few days at the Cleveland office preparing for this duty. He will go to Duluth about the first of the year, and it is probable that the branch office at that point will be in full working order upon the opening of navigation next spring.

A timely and useful publication of the United States hydrographic office is its chart, No. 1684, just issued, showing for the principal lake ports and channels the average times of the closing of navigation, with the mean departure from the average of the yearly dates of the commencement of the ice-season. The chart is compiled from the report of the United States Deep-Waterways Commission of 1896. It forms, as well, a handy reference map of the great lakes, and is sold by the sales agents of the hydrographic office.

The Chicago School of Navigation (No. 20 Michigan avenue) gives promise of being the most successful institution of its kind as yet opened on the lakes. One class recently organized is made up of yachtsmen and members of the naval reserve and numbers about twenty-five. The success of the school last winter with captains and mates of lake vessels has proven of great advantage to the principal, W. J. Wilson, in organizing a class of these men, a few of whom are already at work. The number will be materially increased when navigation is closed.

Miss Lillian F. Stevens of No. 766 Sedgwick street, Chicago, fears that her brother was lost with the unfortunate steamer Idaho and writes the Review in hope of securing some information regarding him. He is thought to have caught the Idaho at Buffalo on his way back to Chicago from New York. "My brother is an engineer," Miss Stevens says, "and alike to my father is a member of M. E. B. A. No. 4 of Chicago. He is about 5 feet 10 inches, weighs about 160 pounds, and has brown hair and dark brown eyes. There is a film on the right eye and he is tattooed on one arm His name is Relly M. Stevens but he is sometimes called Ralph and is also known as 'Mat.' We have not heard from him for over a month."

The New Revenue Cutters.

It is now more than probable that the revenue cutter Algonquin, launched at the ship yard of the Globe Iron Works Co., Cleveland, on Wednesday, will be stationed at Detroit, replacing the old Fessenden, which will be sold. The second vessel building at the Globe works, which will be launched shortly, will probably be stationed at Cleveland. Officials of the revenue cutter service are greatly pleased with the three new vessels—Gresham, Algonquin and the ship about to be launched. There is every assurance that the two vessels now nearing completion will be as fast as the Gresham, and the speed which she attained on official trial would indicate that she is capable of overhauling any ship on the lakes.

The Algonquin, which is practically a duplicate of the Walter Q. Gresham, built by the same company, will be completed and ready for sea May 1, 1898. Her principal dimensions are the same as the Gresham and she will have the same power. The only difference of importance will be in cabins and deck arrangements. Dimensions are 205 feet over all, 188 feet water line, 32 feet beam and 16 feet depth of hold. She will have triple expansion engines, having cylinders 25, 37 1-2 and 56 1-2 inches in diameter, and a common stroke of 30 inches. Steam will be supplied by four single ended boilers of the Scotch type, each 11 feet 6 inches long. Each boiler will have two corrugated furnaces, and the total grate surface will be 185 square feet. The total heating surface will be 5,300 square feet. The propeller is of bronze, with 13 feet pitch. The vessel will be supplied with steam steering gear, steam capstans and steam windlass. She will have an electric light plant and a powerful searchlight.

With the $9,000,000 appropriation for improving the Erie canal expended or tied up in contracts it is found that probably $5,000,000 more must be appropriated by the New York state legislature to complete the scheme of improving all of the state canals. Of the new funds required, probably $3,000,000 will be needed on the Erie canal, and unless this money is appropriated the Erie will be in no better condition than it was before the work was begun. It is said that the legislature cannot authorize the issue of bonds for more than $1,000,000 in any one year for one purpose, consequently there must now be made an appropriation of $1,000,000 each year for three years, if at all, and in the meantime the canal will be in a continued state of imperfection. The serious question is whether it will be possible to get any appropriation through the legislature at this time.

Subscribers to the Review who have been receiving the paper through the marine postoffice, Detroit, will please notify us of home addresses at once, in order that changes may be made for the winter.

More Than Eighteen Million Tons.

A SUMMARY OF LAKE SUPERIOR COMMERCE—DECREASE OF ABOUT 1,500 IN THE NUMBER OF SHIPS BUT AN INCREASE OF NEARLY 2,000,000 TONS IN FREIGHT—COAL SHIPMENTS WILL BE ABOUT EQUAL TO LAST YEAR.

It is now certain that the movement of freight to and from Lake Superior during 1897 (commerce of Canadian and American canals) will exceed 18,000,000 net tons. The canal statistics to Dec. 1 show a total of 17,785,452 tons of freight, and as it is probable that the last vessels will not have passed down from Lake Superior until Monday next, there will be the traffic of about thirteen days to add to these figures.

A most important feature of the canal reports is the decrease in the number of vessel passages compared with 1896, while there is a great increase in the amount of freight moved. Thus far in 1897, 16,862 vessels have moved 17,785,452 tons, against 16,097,880 tons moved in 18,445 vessels to the same date in 1896. In other words 1,583 less vessels have moved 1,687,572 more tons of freight. This is the effect of bigger ships and deeper channels.

The canal reports also bear out the opinion that, notwithstanding the long delay in soft coal shipments on account of the strike of miners, the movement this season, helped out by enormous shipments in November (648,250 tons), will be practically equal to that of 1896. On Dec. 1 the shipments of soft coal through the canals aggregated 2,400,533 tons, against 2,605,172 tons on the same date in 1896. Hard coal shipments through the canals to Dec. 1 foot up 531,183 tons, against 394,210 tons on Dec. 1, 1896.

The main increase in the commerce of Lake Superior is, of course, in iron ore. Flour shipments are practically equal to 1896—a little more than 8,500,000 barrels. In wheat there is a decrease of about 12,000,000 bushels and in grain other than wheat a decrease of about 7,000,000 bushels, but in the total grain movement of the lakes this decrease from Lake Superior will be offset by increased shipments from Chicago. Following is a full summary of Lake Superior commerce to Dec. 1 of each of the past three years:

	VESSEL PASSAGES.	REGISTERED TONS.	FREIGHT TONS.
To Dec. 1, 1897.....	16,862	17,339,114	17,785,452
To Dec. 1, 1896.....	18,445	17,144,385	16,097,880

MOVEMENT OF PRINCIPAL ITEMS OF FREIGHT TO AND FROM LAKE SUPERIOR.

ITEMS.	To Dec. 1, 1897.	To Dec. 1, 1896.	To Dec. 1, 1895.
Coal, anthracite, net tons.....	531,183	394,210	445,277
Coal, bituminous, net tons.....	2,400,533	2,605,172	2.107,804
Iron ore, net tons.....	10,569,965	7,885,769	8,040,558
Wheat, bushels.....	49,847,873	62,062,571	42,817,076
Flour, barrels.....	8,566,637	8,609,998	8,615,347

REPORT OF FREIGHT AND PASSENGER TRAFFIC TO AND FROM LAKE SUPERIOR, FROM OPENING OF NAVIGATION TO DEC. 1 OF EACH YEAR FOR THREE YEARS PAST.

EAST BOUND.

ITEMS.	Designation.	To Dec. 1, 1897.	To Dec. 1, 1896.	To Dec. 1, 1895.
Copper	Net tons....	118,670	116,412	107,117
Grain, other than wheat	Bushels.....	19,497,064	26,292,362	791,079
Building stone	Net tons...	6,249	17,731	24,326
Flour	Barrels.....	8,566,362	8,609,711	8,613,197
Iron Ore.....	Net tons...	10,569,965	7,885,769	8,040,558
Iron, pig.....	Net tons...	13,316	27,948	24,481
Lumber	M. ft. b. m.	799,889	683,386	738,294
Silver ore.....	Net tons...	5	240	100
Wheat	Bushels.....	49,847,873	62,062,571	42,817,076
Unclassified freight	Net tons...	208,505	174,289	138,677
Passengers.....	Number....	19,296	18,475	16,537

WEST BOUND.

Coal, anthracite.....	Net tons...	531,183	394,210	445,277
Coal, bituminous.....	Net tons ..	2,400,533	2,605,172	2,107,804
Flour	Barrels	275	287	2,150
Grain	Bushels.....	34,500	2,209	35,650
Manufactured iron.....	Net tons...	120,828	93,359	74,976
Salt	Barrels	285,449	237,515	271,997
Unclassified freight.....	Net tons...	367,765	343,895	315,469
Passengers.....	Number ...	20,913	18,586	16,944

SUMMARY OF TOTAL FREIGHT MOVEMENT IN TONS.

	To Dec. 1, 1897.	To Dec. 1, 1896.	To Dec. 1, 1895.
West bound freight of all kinds, net tons	3,175,879	3,475,792	2,934,646
East bound freight of all kinds, net tons	14,609,573	12,622,088	11,675,453
	17,785,452	16,097,880	14,610,099

The total number of vessel passages to Dec. 1, 1897, was 16,862 and the registered tonnage 17,339,114.

A Few Points from Major Symons on the Canal Question.

Editor Marine Review:—I have read in your valued paper Mr. Wisner's criticism of my report. In this criticism Mr. Wisner strikes the keynote of the whole question of cheap water transportation between the upper lakes and the seaboard via the Erie canal route. The present Erie canal is not used to anything like the extent to which it should be used, or to which its value in the transportation world entitles it to be used. What is the reason?

The cause is undoubtedly the utter lack of organization of the canal interests on correct and broad business principles. And this lack of organization is very carefully fostered by the great interests with which the canal comes into competition. The state of New York has upon its statutes a law limiting the capital stock of a canal transportation company to $50,000. This capital is of course utterly inadequate to allow the company to own the requisite canal boats, lake steamers, terminal facilities, etc., which are necessary for the transaction of through business in a responsible and economical manner from the upper lakes to the seaboard and vice versa. The consequence is that the canal only gets the pittance of business which it can pick up in Buffalo and Tonawanda, and some of the local business along its course. The business on the canal is in as bad a condition as any enemy of it could desire.

An effort was made last winter for the repeal of this law, but it was unsuccessful owing to the opposition of some local industries along the line of the canal, and the opposition of the pretended friends of the picturesque individual boatman, whose business it was asserted would be injured if big companies were allowed to use and monopolize (?) the canal, as if the lot of the individual boatman could be worse than it is at present.

When the work of canal improvement now under way is completed, and boats carrying 400 tons replace those carrying 240 tons and are able to make their trips in much less time, the necessity for repealing this limiting law, or finding some way around it, will be greater even than at present. Unless this is done, the $9,000,000 to $15,000,000 required for the canal improvement may be considered as practically wasted. The same would be almost equally true of a canal enlarged to accommodate 1500-ton barges, as stated by Mr. Wisner. It is, however, morally certain that the canal would never be enlarged to the suggested capacity with such a blighting law in force.

My whole report and the determinations therein are based upon the theory that the business on the canal would be conducted with the same freedom that is enjoyed by lake lines and the lake and rail lines. It is very much to be hoped that by the time the present canal improvements are completed, the state of New York will plainly see the wisdom of repealing the limiting law and permitting the organization of companies with sufficient capital to control lines of lake steamers, operated in connection with lines of steam canal fleets, with good terminal facilities at upper lake ports, Buffalo and New York, and intermediate points.

With companies so organized on a broad-gauge basis, and securing through business at upper lake ports and at the seaboard, traffic of magnificient proportions will again flow through the Erie canal, at rates far below any yet realized, to the direct benefit of the great west and of New York, which will regain some of its lost trade. With a still further enlarged 1500-ton Erie canal, the benefits would be still greater, always provided that the business of transportation on it is conducted in a free, unlimited and business-like manner, and on a large scale.

Mr. Wisner makes a statement to which I can not agree. He says: "The day of small vessels in competition with railroad lines is past." This is probably true of small vessels run singly as in the olden times on the lakes, but is it true of small vessels run in fleets as in the coastwise coal transportation business? Could any railroad compete successfully with fleets of four 1500-ton barges, running from Duluth to New York city, or from Duluth to Buffalo?

Such small vessel fleets may not be able to compete with the great lake freight vessels on the lakes, but they certainly would be able to compete with any railroad. And it is an open question in my mind, which could furnish the cheaper transportation, through fleets of barges from the upper lake ports to the seaboard, or large lake vessels running through the lakes and transferring at Buffalo into fleets of barges to run through the canal to the seaboard. THOMAS W. SYMONS,

Major, Corps of Engineers.

United States Engineer Office, Buffalo, Dec. 2, 1897.

Difficult Job on the Gogebic.

"The unsatisfactory methods of old-time wrecking concerns are disappearing from the lakes," said a Cleveland vessel owner upon reading of the release of the steamer Gogebic from North Manitou island on Saturday last. "A few years ago the policy of wreckers was to fleece both vessel owners and underwriters and pile up charges for all the time they could possibly put in on a job. A wreck like that of the Gogebic, occurring late in the fall and in such a place as the Manitous, was sure to be given up as a total loss after everybody concerned had paid exorbitant charges for tugs, lighters, etc. But with all other lines the wrecking business has been improved and the managers of the Favorite are entitled to a great deal of credit for their work on the Gogebic."

The Favorite encountered a very difficult job with the Gogebic, as she rested on boulders and was out her whole length. Weather was around zero most of the time and the vessel was all iced up, making it a hard task to fasten the hutchicks on her sides. With a very uneven bottom under the vessel, the work of getting ready for each lift was also very slow. It was necessary to jack her up six times before getting her off.

Mr. A. F. Yarrow of the English firm of Yarrow & Co., torpedo boat builders, has visited Cincinnati and Chicago and is now in Cleveland. Mr. Yarrow is accompanied by Mr. G. Greenbaum, who is associated with him in the management of affairs of Yarrow & Co. While in Cincinnati these gentlemen placed an order with the Davis & Egan Machine Tool Co. for several machine tools.

MARINE REVIEW

DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

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The books of the United States treasury department on June 30, 1896, contained the names of 3,333 vessels, of 1,324,067.58 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1896, was 383 and their aggregate gross tonnage 711,034.28; the number of vessels of this class owned in all other parts of the country on the same date was 315 and their tonnage 685,204.55, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1896, was as follows:

	Number.	Gross Tonnage.
Steam vessels	1,792	924,630.51
Sailing vessels and barges	1,125	354,327.60
Canal boats	416	45,109.47
Total	3,333	1,324,067.58

The gross registered tonnage of the vessels built on the lakes during the past six years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30.	1891	204	111,856 45
" " "	1892	169	45,968.98
" " "	1893	175	99,271.24
" " "	1894	106	41,984.61
" " "	1895	93	36,352.70
" " "	1896	117	108,782.38
Total		864	444.216.36

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (*From Official Reports of Canal Officers.*)

	St.Mary's Falls Canals.			Suez Canal.		
	1896*	1895*	1894	1896	1895	1894
Number of vessel passages	18,615	17,956	14,491	3,409	3,434	3,352
Tonnage, net registered	17,249,418	16,806,781	13,110,366	8,560,284	8,448,383	8,039,175
Days of navigation	232	231	234	365	365	365

*1895 and 1896 figures include traffic of Canadian canal at Sault Ste. Marie.

In the North American Review for December Prof. R. H. Thurston, director of Sibley College, Cornell University, who was once a member of the engineer corps of the navy, comes to the assistance of the corps in its fight for treatment equal to that accorded to the line officers. Mr. Thurston says: "So far depleted has become the engineer corps that not an officer can be detailed for duty to inspect the iron and steel furnished for ordnance; only one is detailed for inspection of armor; but two are to be found at the Boston navy yard, only seven at League island, and a baker's dozen or so at the New York yard. Not an officer is on the list of lecturers at the War College at Newport, and not one at the torpedo station. Meantime, of the deck officers, 338 were, at the time these figures were gathered, at sea, and nearly 400 were on shore duty, of whom ninety were in the city of Washington. The iron and steel inspection boards, altogether, include but one-seventh engineer officers. The remainder are professionally inexpert. The tremendous strain which has come upon this splendid body of officers through the gradual increase in the extent and difficulty of its work and the decrease in its numbers, is reflected in the following instructive and pathetic figures: On the first of January, 1886, there were only 293 officers in the corps, and of these seventy-one, or one-fourth, were already on the retired list; but by Jan. 1, 1896, the previously terrible record had become 173 on the active and 104 on the retired list—nearly two-thirds as many on the latter as on the former list. No such startling statistics are to be found in the annals of our own or of any other navy. At this rate the retired list will soon become longer than the active list, and destruction of a faithful and patriotic body of men must, under existing circumstances, go on with continually increasing rapidity, until a final crash disables the whole naval service more completely than would be the explosive destruction of all its guns."

"Fastest merchant ship in the world" is the title fully earned by the North German Lloyd steamer Kaiser Wilhelm der Grosse. It is the hourly average that tells best the power of the Atlantic liner. Until the Kaiser made her recent fast run from New York to Southampton—5 days, 17 hours and 8 minutes, which is better by 17 hours and 6 minutes than the eastward record of the American liner St. Paul—the Cunard steamship Lucania had the distinction of making the fastest hourly average across the sea. It was 22.01 knots. The Kaiser beat this by more than a third of a knot, her average being 22.35 knots. Maintaining this average, the Kaiser could cover the Queenstown route in about 5 days and 4 hours. The record of the Lucania on that route is 5 days 7 hours and 23 minutes. The big German ship has the best record for a single-day's run to the westward (made on her maiden voyage), and the only record she has to break now is the best single day's run to the eastward; she will doubtless do it as soon as she gets pleasant weather. On this last voyage from New York to Southampton she equalled the best eastward day of the Campania, 528 knots. This day's run is equivalent to about 566 knots on a westward nautical day of 24 hours and 50 minutes. The Kaiser covered 3,065 knots in daily runs of 401, 520, 513, 528, 525, 507 knots, and 71 knots to the Needles. She had only one day really good weather, and this was the day when she made the big run of 528 knots. The builders of the Kaiser guaranteed that she would make an average of 22 knots on five consecutive trips. Mr. Gustav Schwab, the New York agent of the line, has no doubt that she will do this handily in placid seas.

The policy of building new docks and improving navy yards rather than entering into contracts for more vessels of war seems to have met with approval from the press of the country. President McKinley's endorsement of the plans of the secretary of the navy in this regard has been given special prominence in comments on the message. In closing his report the secretary of the navy says that while the building of a ship is a definite fixed expense incurred once for all, the expense for maintaining it, of providing it with docks, naval stations and other necessary facilities, of manning and equipping it, and of keeping it in repair—in short, of running the naval establishment—is and must continue to be a large charge on the public treasury, and for a time, certainly, an increasing one. Economy, he admits, is necessary at large and in detail, not merely as a good theory to proclaim, but as an actual practice to perform. With the best exercise of this virtue, however, expenses will, he says, be large in this as in every other department of government which represents the interest of a country so vast as ours. He believes, however, that the people, whose arm the navy is and who evidently appreciate its potential usefulness, desire to maintain it at the point of highest efficiency, and will do so the more cordially the more frankly they are informed of its real and deserving needs and demands and of the justinable cost they necessitate.

It may be stated now that many who were inclined to treat the wire consolidation with sneering skepticism are taking the affair more seriously and there is being displayed a tendency to overrate the chances of success. In fact, its consummation is regarded by some as a forgone conclusion. That is going altogether too far, although it is true that the chances of success have improved. What obstacle there is is not due to unwillingness to enter the consolidation. There are collateral questions to decide which too naturally come up in such extended and intricate negotiations. Their solution depends upon outside advice. Rumor has been very busy, and in a number of instances gives the consolidation a scope of interests which is quite unwarranted. In others the extent of the collateral and subsidiary property involved is subject to choice by the purchasers. All that can be said now is that the negotiations have made progress, but that they are far from the point where it is safe to refer to them as even close to a preliminary settlement. It will probably take two months at least before the new company is in control, if matters run smoothly.—Iron Age.

Details of the lease of the Tilden mine, which was recently turned over to the Oliver Mining Co. (Carnegie interests) by John D. Rockefeller were published in the last issue of the Review. In one important particular the summary of provisions of this lease was in error. It was said that the Oliver company is not bound in the Tilden lease to ship its ore in Mr. Rockefeller's vessels. This is a mistake. The ore will be moved by lake in Mr. Rockefeller's vessels or in vessels provided by his representatives for the transportation of it. This statement is made for the reason that the output of the Tilden mine will amount to at least 500,000 tons annually, and it is important that vessel owners should not be misinformed regarding so large a block of tonnage. The transportation of the output of the Norrie mine, also controlled now by the Oliver company, is another matter. This property was not secured by the Oliver company from Mr. Rockefeller but was purchased outright from other parties.

Several dispatches from Philadelphia of late refer to meetings of a committee, selected at Washington some time ago by representatives of leading American steamship lines and organizations of ship owners and ship builders, to formulate for presentation to congress some method for the enlargement of the American merchant marine. This committee has taken no action and will probably not be heard from until after the beginning of the new year. The committee is proceeding carefully with a view to formulating a measure upon which all interests may be united. It is therefore probable that the shipping question will be given little attention in Washington until a report is had from these important interests.

A ruling just made public by the treasury department is to the effect that under the civil service rules, section 158, applicants for appointment as local inspector of hulls of steam vessels on inland waters must have had at least five years' actual practical experience as master or first-class pilot of steam vessels on inland waters and the experience must have been under United States license of the highest grade granted upon the waters on which the applicant has been employed, which fact must be on record in the treasury department. An applicant must be free from defect of color blindness, and not under thirty or over fifty-five years of age.

Mechanical Engineers.

Several of the new officers of the American Society of Mechanical Engineers, elected at the New York meeting, are well known in ship building circles. Mr. W. R. Warner of Cleveland, the retiring president, said the meeting was the most successful in the history of the organization, the attendance being about 600. New officers are as follows: President, Charles Wallace Hunt, New York. Vice-Presidents, E. S. Cramp, Philadelphia; S. T. Wellman, Cleveland; W. F. Durfee, New York city; John C. Kafer, New York city; David R. Frazer, Chicago; Walter S. Russell, Detroit. Managers, Norman C. Stiles, Watertown, N. Y.; E. D. Meier, St. Louis; George W. Dickie, San Francisco; H. S. Haines, Atlanta; Gus. C. Henning, New York city; A. Wells Robinson, Milwaukee; James B. Stanwood, Cincinnati; Henry H. Suplee, Philadelphia; George Richmond, New York. Treasurer, William H. Wiley, New York city.

Notices of two contracts for the construction of foundry buildings and machine shops have been sent out during the past week by the Berlin Iron Bridge Co. of East Berlin, Conn. One of the contracts is with the Flushing Gas & Electric Co. of Flushing, L. I., and the other with the Foxboro Foundry & Machine Co. of Foxboro, Mass.

On Sunday last, with a strong wind from the west, the draft of water at Ballard's reef in the Detroit river was reduced to a trifle less than 16 feet and several times during the week it was barely 17 feet.

The President and the Navy.

President McKinley's reference to requirements of the navy in his message to congress is simply an endorsement of the recommendations of the secretary of the navy.

"The present immediate effective force of the navy consists," the president says, "of four battleships of the first class, two of the second and forty-eight other vessels, ranging from modern cruisers to torpedo boats. There are under construction five battleships of the first class, sixteen torpedo boats and one submarine boat. No provision has yet been made for the armor of three of the five battleships, as it has been impossible to obtain it at the price fixed by congress. It is of great importance that congress provide this armor, as until then the ships are of no fighting value. The present naval force, especially in view of its increase by the ships now under construction, while not as large as that of a few other powers, is a formidable force; its vessels are the very best of each type, and with the increase that should be made on it from time to time in the future and careful attention to keeping it in a high state of efficiency and repair, it is well adapted to the necessities of the country. The great increase of the navy which has taken place in recent years was justified by the requirements for national defense and has received public approbation. The time has now arrived, however, when this increase, to which the country is committed, should for a time, take the form of increased facilities commensurate with the increase of our naval vessels. It is an unfortunate fact that there is only one dock on the Pacific coast capable of docking our largest ships, and only one on the Atlantic coast, and that the latter has for the last six or seven months been under repair and therefore incapable of use. Immediate steps should be taken to provide three or four docks of this capacity on the Atlantic coast, at least one on the Pacific coast and a floating dock on the gulf. This is the recommendation of a very competent board appointed to investigate the subject. There should also be ample provision made for powder and projectiles and other munitions of war, and for an increased number of officers and enlisted men. Some additions are also necessary to our navy yards for the repair and care of our larger number of vessels. As there are now on the stocks five battleships of the largest class, which cannot be completed for a year or two, I concur with the recommendation of the secretary of the navy for an appropriation authorizing the construction of one battleship for the Pacific coast, where at present there is only one in commission and one under construction, while on the Atlantic coast there are three in commission and four under construction, and also that several torpedo boats be authorized in connection with our general system of coast defense."

Fashionable Power of the Day.

Geo. W. Dickie of the Union Iron Works, San Francisco, who has been known as an ardent advocate of hydraulic power for auxiliary purposes aboard ships, and especially ships of war, makes frank admission of a change of opinion in a paper on "Auxiliary Engines and Transmission of Power on Naval Vessels," which was read, a few days ago, at the New York meeting of the American society of Mechanical Engineers. Mr. Dickie discusses in a very interesting way three methods of transmitting power—compressed air, electricity and hydraulic power—and concludes as follows:

"The aim has not been to show the superiority of any one system over another, the comparisons made being simply to show that there is no mechanical difficulty in operating all auxiliaries by any one of the systems, and to express a hope that our government would either adopt some one system and carry it out complete, developing that system to its utmost efficiency, or else take one or two similar ships and fit them with power transmission systems completely representing different agents—say one electric, one hydraulic, and one compressed air. Let each be placed for three years in the hands of officers heartily in favor of the system in use on their own ship, and thereby obtain a practical demonstration of the very best points in each system.

"While we have hitherto advocated with all the ability we possess a complete hydraulic system, our experience in the practical working of hydraulics on shipboard has not been of the most pleasant character. Officers are required to care for and get the best out of a hydraulic system, while personally they would rather sit up all night with an electric plant than spend a moment more than the law requires with a water motor. The future hopes of the young officer are centered in electricity, and he devotes himself to it with a will; and so long as that condition prevails, the electric method of transmission will have the best chance to succeed, because with that it has a flexibility and a general adaptability which the other systems do not in themselves possess. The electric system would receive more skilful attention on the part of the officers in charge than any of the other methods. The whole installation would be more attractive to the educated engineer. It is the fashionable power of the day, and young men are more eager to give their attention to this than to any other form of generated energy; and if any system is the thing desired by those who are to have the operating of it, that system will give better results, will be more carefully nursed, and will be studied in all its details, with the object of improving every result obtained. This is natural, and must be considered in connection with any proposed advance in engineering methods. Some time ago we were fitting the Howden system of forced combustion to a vessel, the engineer of which did not believe in its merits; but he was honest, and assured us that he would do nothing to prevent it being a success. It was necessary to find another engineer who would do everything he could to help make it a success before success came. So the fact of electric transmission being desired by so many engineers is a point in its favor which will secure the care that means economy, apart altogether from the inherent qualities of the system itself as compared with others."

Army and navy charts for the lakes are kept in stock by the Marine Review, Perry-Payne building, Cleveland.

Cutting Holes in Vessels' Sails.

The newspapers some time ago contained accounts of the experiments of an Italian shipmaster who claimed that the speed of most sailing ships could be materially increased by making holes in their sails. The Italian captain held that in the ordinary sail a cushion of air is collected in the hollow or belly of the canvas, lessening the pressure of the wind on the sail, and thus retarding the speed of the vessel. To prevent this he cut holes in the sails of his ship, let the wind out, and claimed that he had increased the speed of his vessel to a considerable extent. He patented his discovery in Europe and mayhap in this country also. Now a ship master from Nova Scotia has put the scheme to practical test. He is Capt. W. B. Butler of Yarmouth, an intelligent mariner who is in command of the British four-masted steel ship G. W. Wolff, owned by Samuel Lawther of Belfast, Ireland. The experiments were made while on a trip from England to Pisaqua, Peru, and an account of the captain's conclusions have been forwarded to the New York Herald. He says:

"As you are more or less interested in maritime matters, perhaps the result of my experience in reference to a recent innovation recommended by an Italian ship master to increase the speed of sailing vessels may not be altogether uninteresting. I refer to the plan of cutting holes in the sails with the object of obtaining greater speed than could otherwise be hoped for. I have for a number of years cut out and made my own sails in preference to having them made on shore, and, naturally, the claim put forth by the Italian interested me from the first, so that, getting what information I could in regard to the size and location of the holes, I decided to try them. As a result of my experience I have arrived at the conclusion that it is only in what may be called 'baggy' sails that the holes will prove an advantage.

"The argument used by the Italian is that in the ordinary sail a cushion of air is collected in the hollow of the sail, whereby the pressure of the wind on the canvas is lessened, and, consequently, the speed of the vessel. To obviate this, holes are made, affording an outlet to this air cushion. By doing this, the wind strikes directly upon the canvas instead of the cushion, and better results in the way of speed were attained. To me this seemed a very reasonable argument, but it is not applicable to flat sails, as I have proved. America demonstrated to the world in 1851 the superiority of flat sails over baggy ones, but, notwithstanding this, there are a few people who yet believe in baggy sails. It is a well known fact that Italian do not make as good voyages as do English or German ships of equal size and power. The reason is to be found in their baggy and ill-sitting sails. Who that has been much to sea cannot recall having passed Italian vessels with their topsails and topgallant sails hauled down on one side, while the other sides of the sails have been off from the yards a fathom or more? Saiis made baggy and set after in this manner cannot be expected to influence a ship as flat sails set properly can.

"On a baggy sail the wind strikes first upon its edges, and from there, following the swell of the canvas, rushes from all sides to a common center in the sail where the hollow is greatest, filling this part of the sail with conflicting eddies. To cut a hole in this particular spot allows this air cushion to escape, and creates a draught, which it is reasonable to suppose may be an advantage and gives color to the Italian's argument. I have tried these holes in my flat sails without effecting any apparent gain in speed. There are no hollows to fill with useless air, and I conclude that the wind after striking the canvas rushes off at the foot and sides of the sail. If any of your seafaring friends in New York are thinking of trying the Italian's plan, I would say to them, if they have flat sails, 'Don't!' If their sails are old and baggy, I think they may with advantage cut the holes. In my case I have either to fill up the holes in my sails, or on my return to Europe pay a royality of $3,500 a year. There is no doubt in my mind which of these alternatives I shall choose."

Stock of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, Dec. 4, 1897:

	Wheat, bushels.	Corn, bushels.
Chicago	5,614,000	17,764,000
Duluth	2,632,000	1,034,000
Milwaukee	146,000	178,000
Detroit	221,000	86,000
Toledo	262,000	719,000
Buffalo	1,939,000	1,508,000
	10,814,000	21,289,000

As compared with a week ago, the above figures show, at the several points named, a decrease of 146,000 bushels of wheat and 320,000 bushels of corn. On the same date there was afloat on the lakes 3,202,000 bushels of wheat, 2,326,000 bushels of corn and 2,218,000 bushels of oats. Grain afloat on the canals aggregated 17,000 bushels of wheat and 127,000 bushels of oats.

The DeLaney Forge & Iron Co., Buffalo, has recently made considerable improvement in its plant, putting in a new boiler, 50-ton steam crane and additional furnaces. They have orders from the Chicago Ship Building Co. for the forgings for a steamer and barge and from F. W. Wheeler & Co. for engine forgings. New rudders were furnished the Aurania, Penobscot and Harlem. This company has furnished forgings for a large number of the principal lake steamers.

A newer process of brazing is threatening the old-time flame method. That process is liquid brazing. It is of interest to all metal workers. Write the Joseph Dixon Crucible Co., Jersey City, N. J., for particulars.

An up-to-date lithograph map of the Alaskan gold fields, printed in six colors, complete and accurate. If interested, send five 2-cent stamps to advertising department, Nickel Plate Co., Cleveland. Dec. 31, 393.

Disadvantages of Draw Bridges.

Recent examples of drawbridge construction in the United States show that the disadvantages of this method of crossing navigable streams or inlets are at present being realized to their fullest extent. It is now a good many years since the competition between the great railway companies of Great Britain had the effect, first, of abolishing ferry links in the chain of transportation, and, second, of sending drawbridges of all kinds to join the defunct ferries. The rule for the English railway companies then became either high-level bridge or tunnel. High-level bridges were thrown across the Menai straits, the Frith of Tay, the Frith of Forth, the Tyne, and other navigable waters; while the Thames, the Mersey and the Severn were pierced by tunnels. These vast, and in most cases apparently unremunerative, engineering works were brought about to gain a saving in minutes, coupled with a thorough carriage between great cities. Fifteen minutes gain or loss in the five-hour run from Liverpool to London seems a small matter, but when a ferry trip across the Mersey to Birkenhead was added to the few minutes' delay in reaching London, the sensitive through-passenger traffic practically deserted one great railway system and gave its patronage to another. It must be remembered, in this connection, that English railways always agree to charge the same rates between competing passenger points, so that the railway which labors under any natural disadvantage has to make up for it, not by cheaper fares, but by increasing the frequency of its trains and generally improving its service. The tunnelling of the Mersey or the bridging of the Forth, therefore, instead of being a question of a few passenger fares more or less, becomes a policy upon which the future prosperity of the investing railway may depend. But, ferries being inadmissible for the reasons already indicated, it may be asked why the English railway companies have shown such an antipathy to drawbridges. The answer to this is that all trains must slow down approaching a drawbridge, that the most important express trains are as likely to be delayed by its opening as the slowest freight trains, and—a matter which English railway companies always carefully consider—every drawbridge has in it the possibilities of an accident, the damages of which would pay the additional cost of a perfectly safe high-level bridge or tunnel.

Applying these remarks to the recent construction and equipment of drawbridges in the United States, we find that all the English objections to their use exist with even more force. Direct railway communication between the largest cities in the country—New York and Chicago—and their respective contiguous territory is dependent upon drawbridges. During the heavy morning or evening suburban traffic in these cities, the opening and closing of a drawbridge, no matter how quickly accomplished, means the stalling of half-a-dozen trains. The elaborate derailment plans, with special signals and signal towers, attached to all the railway drawbridges in the United States, bear eloquent testimony to the well-grounded fear that the best human agency must sometimes fail in keeping the moving train out of the open draw. Moreover, as all navigable waters in the United States are under federal jurisdiction, while the land on either side is under the control of the respective states, the natural conflict of interests thus engendered has resulted in making the federal authorities keep open to navigation every third-rate ditch which has uninterrupted communication with some main system of waterways, especially if it be in the neighborhood of a large city. Thus the railways, not having yet, except in a very few instances, decided that they must either tunnel or make high-level bridges near large cities, if they would give fast and uninterrupted passenger service, are compelled to rely on drawbridges.

The type of drawbridge most commonly used is the deep steel lattice girder, balanced on a central pier, which is surmounted by a turntable drum. The width of clear channel which one of these drawbridges must expose when open varies from 50 to 200 feet. Probably the largest bridge of this kind was, until recently, the four-track structure belonging to the New York Central Railway crossing the Harlem river in New York city. The draw span is 400 feet long and 61 feet wide; when open, it gives two equal-sized channels of 165 feet each. In order that it may be opened and closed as quickly as possible, two fifty horse power steam engines with oscillating cyclinders are provided, and these are able to open or close it in two minutes. A much longer bridge of the same general type was opened a short time ago between Duluth and Superior. This bridge, or rather its swing span, is 493 feet long and 59 feet wide, providing double railroad tracks, double trolley tracks, ordinary roadways and footpaths. When this bridge is opened, it gives two clear channels of 200 feet each. Curiously enough, with the same horse power as that of the great New York Central bridge, its span can be thrown open in considerably less time. The Duluth bridge, however, is worked by two fifty horse power trolley street car motors, fed by an electric current brought from an adjoining power house by submarine cable through the middle of the revolving drum, and they regularly open or close the swing span in 1¼ minutes. In Chicago, where the river is comparatively narrow, a new form of drawbridge is rapidly coming into use. This is known as the Scherzer rolling lift bridge. It is of the bascule type, the leaves meeting in the center when the bridge is closed and rising upright on opposite sides of the river when the draw is open. As these bascule bridges, while obviously unsuited for very long spans, require no pier in the middle of the river, they are a distinct gain to navigation wherever they can be used.

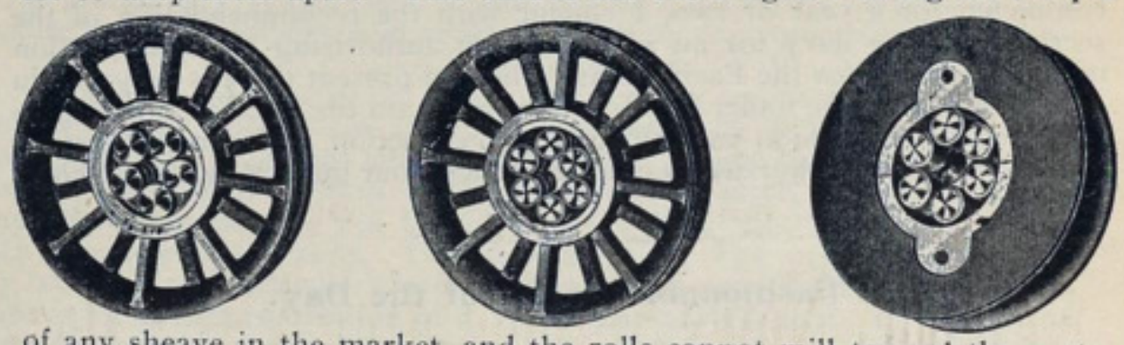
Such bridges have two advantages, either for railroad or general use. One of these is that each leaf can be raised or lowered independently of the other so that time may often be saved in this manner. The other advantage is that when a leaf is up, it presents an unpassable barrier to approaching trains or wagons. On this account it is well suited for elevated railways where trains run on very short headway and the possibilities of forgetfulness on the part of the engineer in regard to an ordinary swing span are very great. It is noted that the Eads bridge over the Mississippi was built without any draw span, and that the cantilever bridge over the Hudson at Poughkeepsie—the only one below Albany—has no draw span, and as time goes on there is little doubt that the railway companies, acting in the public interest, will find means to have many of the so-called navigable inlets and rivers of today crossed with fixed bridges of moderate elevation, instead of cumbersome time-absorbing draw-spans with which they are now equipped. There is something almost grotesque in the fact that the skipper of a fifth rate tug boat has power at his pleasure to delay for ten minutes the entire through railway traffic of New York city, and a very large proportion of the through railway traffic of Chicago.—Cassier's Magazine.

A Plea for Ship Protection.

Hon. Wm. Rogers, ship builder of Bath, Me., sends the Review a copy of the Bath Independent of Nov. 27 containing an article, in which he makes a strong plea to the president and congress to stand by the Republican platform of protection for American shipping. Mr. Rogers presents some plain facts bearing on the shipping question. "I have enjoyed reading in the Review," he says, "of the great strides that have been made in lake shipping. The progress which is so apparent in the industries bordering the shores of your immense inland waters is surprising to the people of the east. We do not realize their extent nor your resources. I have been a builder and owner of wooden ships for deep-sea transportation for many years, and although endeavoring to keep progress in the race for that business, I confess we are far behind. Our coastwise transportation has maintained itself and grown in strength. There has been an innovation in that direction in the use of the 'barge,' which has evidently come to stay, even upon salt water. Reading in your Review and in other papers of the size of steel barges on the lakes, I see no good reason why vessels should not be constructed here for 6,000-ton cargoes. We upon the coast feel highly gratified at the enthusiasm now expressed in favor of some strong measures being adopted by the government to build up our merchant marine. Your columns will have much influence toward it, and I hope you will keep up this good work."

Ferrall's Sheaves.

The illustrations herewith show a lignumvitæ sheave with six rolls and two galvanized iron sheaves with composition boxes for steel rolls to revolve in, one having five and the other six rolls. They are simple; the rolls are slotted in the center and run on an interior rail, having a separator to keep them apart. This sheave has the longest bearing on the pin



of any sheave in the market, and the rolls cannot mill toward the center on account of the interior rail. Wire rope sheaves fitted with the Ferrall roll can be overhauled by one man, where two are usually required. The galvanized iron sheave is something new and will be in demand on the lakes and ocean, as it will not rust. The Bagnall-Loud Block Co., Boston, Mass, manufacture them.

Some years ago, less than a score of firms were engaged in the manufacture of piston packings. Of late years hundreds have engaged in the business, and every engineer knows that the market is flooded with all kinds of cheap packings. Many manufacturers of inferior packings have retired but some that are still in the market are not of the best. The great increase in the use of steam machinery with high speed and high pressures has created a demand for superior packings for pistons and plungers of engines and pumps and all kinds of hydraulic machinery, refrigerating apparatus, etc. One firm in this line, the Garlock company, has had a most cordial reception from the start, through its untiring efforts to serve its patrons faithfully with high grade packing of known reliability for quality, durability and economy. The name "Garlock" is recognized as the standard of excellence by engineers in every country. Customers of this company are numbered by the thousands. "Wherever civilization is found," says a circular from an eastern publishing concern, "we also find the steam engine and Garlock packings—the two go hand in hand in nearly every part of the globe."

The office of the Marine Review, Perry-Payne building, Cleveland, is the only place where a complete supply of lake charts of all kinds is constantly to be found. Every chart is corrected to date of issue, and the stock includes all publications of the hydrographic office, as well as the charts made by the army engineers corps. The vessel master who has charts published two or three years ago will find new ones of far greater value in the list that has been increased almost every week of late. Prices are those fixed by the government, which do not represent even the cost of paper and printing. Sets of sectional charts of places like Green bay and Georgian bay, which in time past have sold as high as $15, may now be had on a single sheet at 30 cents to $1.

Senator James McMillan of Michigan has taken up the suggestion of Chicago naval reserve leaders and has introduced in the senate a bill providing that the president be authorized to have constructed on the lakes a gunboat at a cost of not more than $230,000, to replace the Michigan. This is in accordance with the recommendation made a few days ago by Assistant Secretary of the Navy Roosevelt in his report dealing with the naval reserves, and it is understood that Mr. McMillan will have the support of the navy department for his bill. He is a member of the committee on naval affairs and the bill will be referred to that committee.

The announcement in Buffalo newspapers that the contract for a package freight steamer of the largest type, on which Manager Douglas of the Western Transit Co. has been figuring for some time past, has been given to the Detroit Dry Dock Co. cannot be verified as yet, but the facts will probably be given out in a day or two. The Buffalo report is uncertain for the reason that it was understood that two new steamers instead of one were under consideration.

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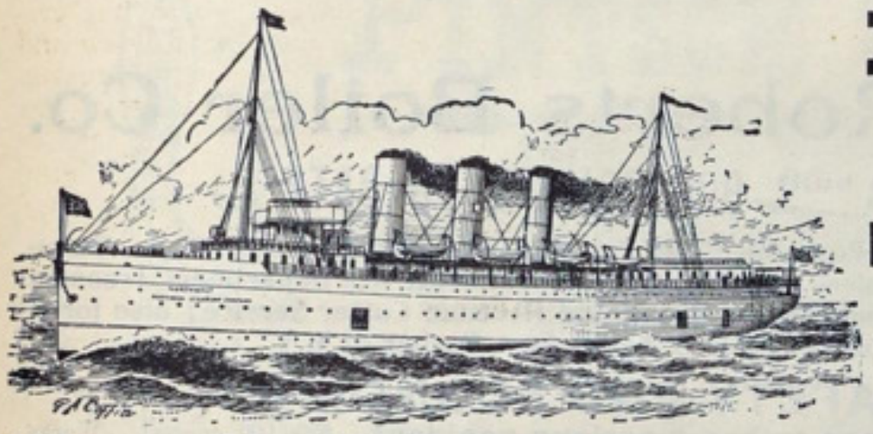

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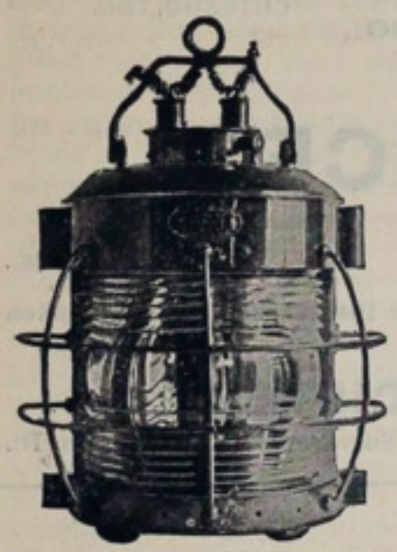

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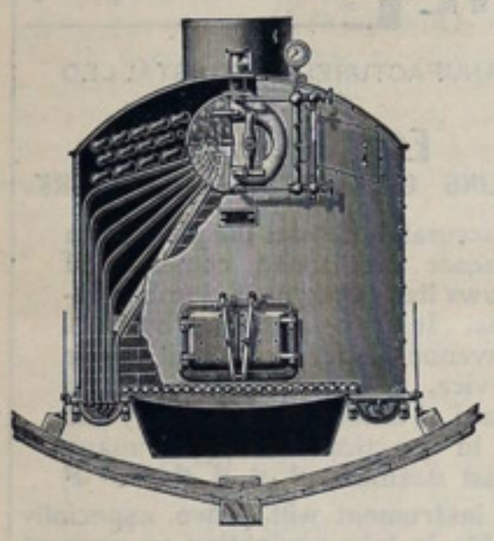

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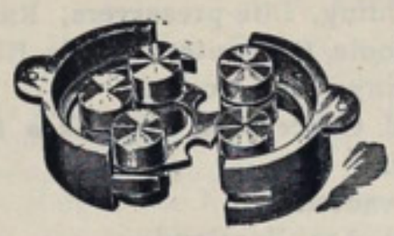

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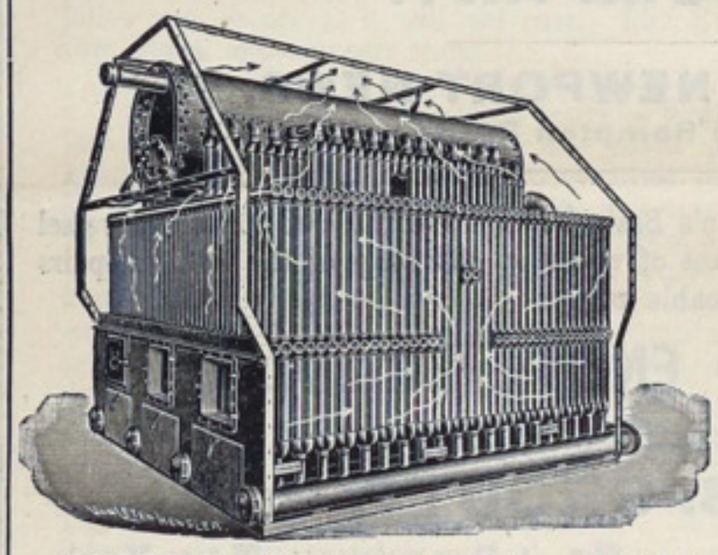

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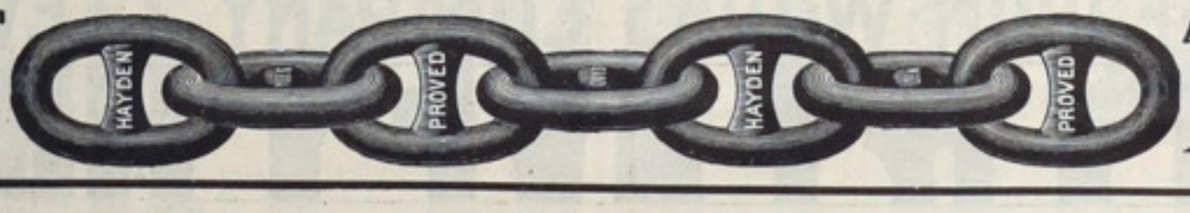

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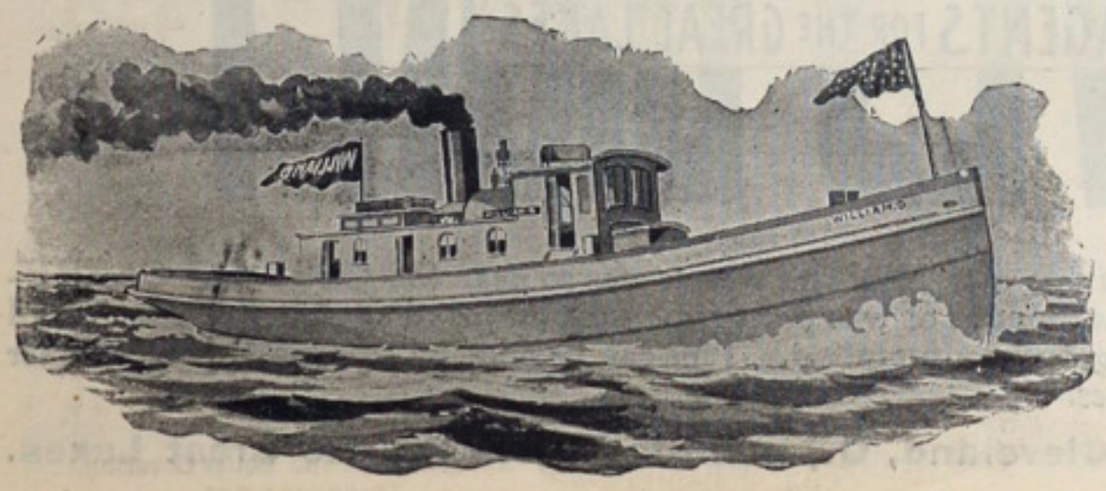

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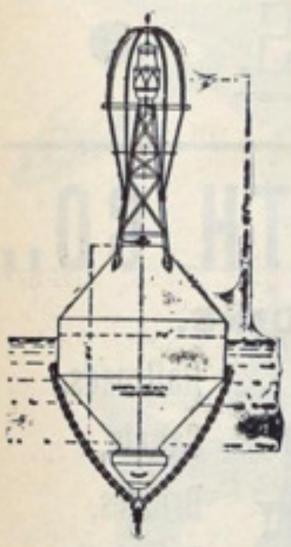

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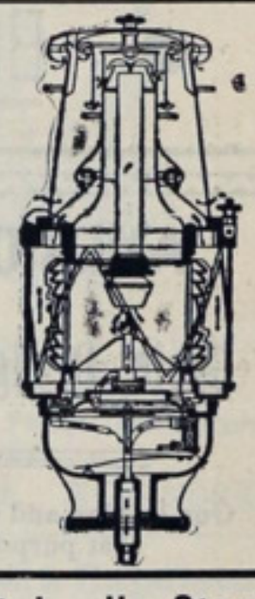

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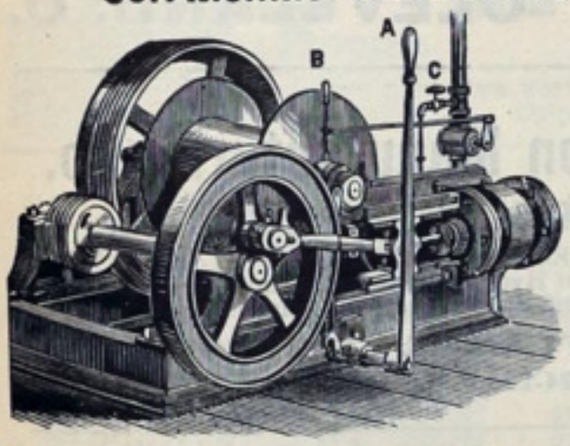

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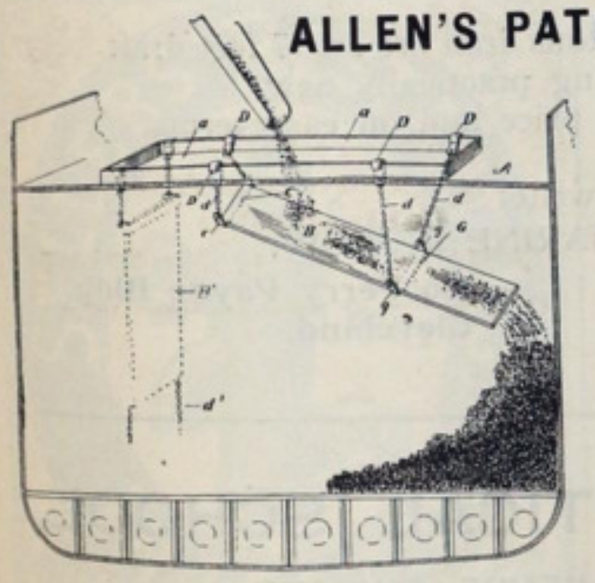

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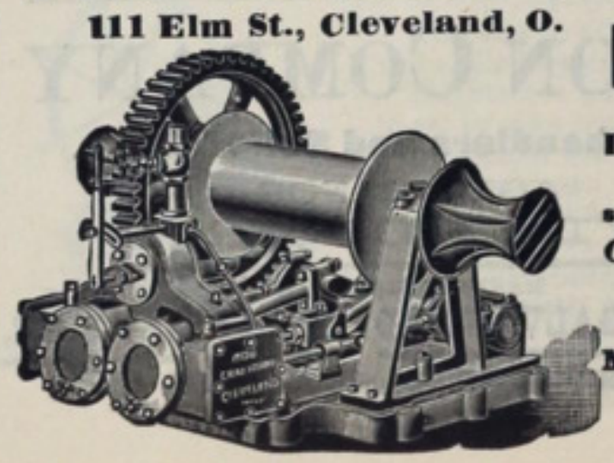

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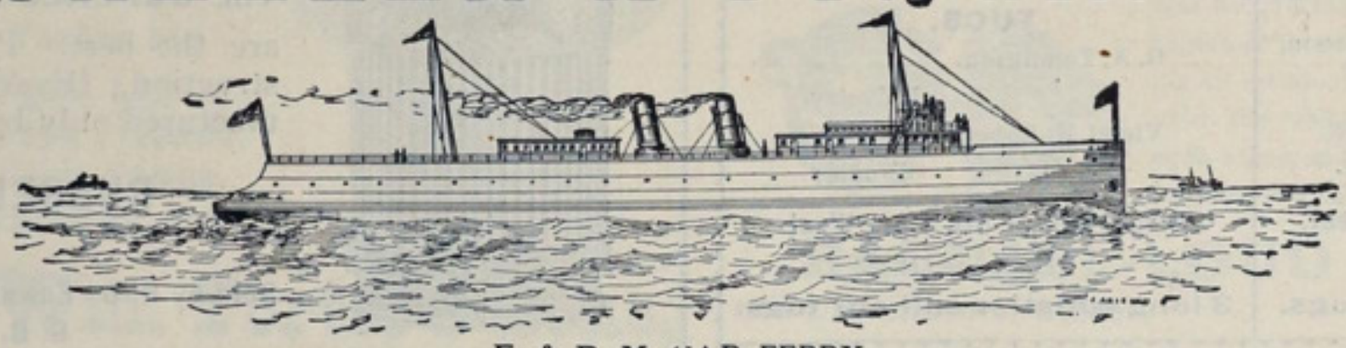

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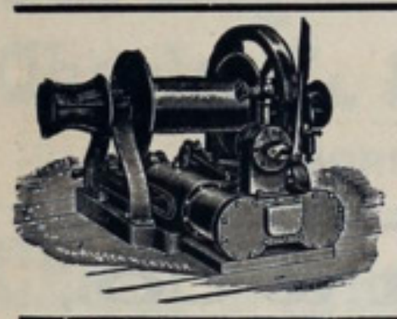

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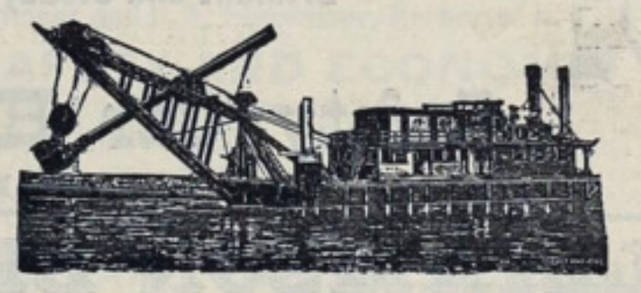

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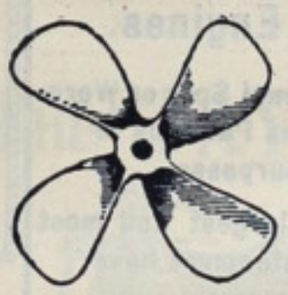

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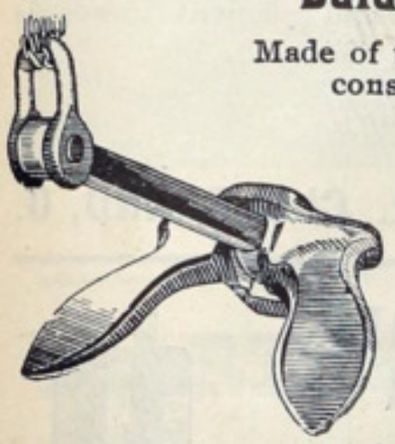

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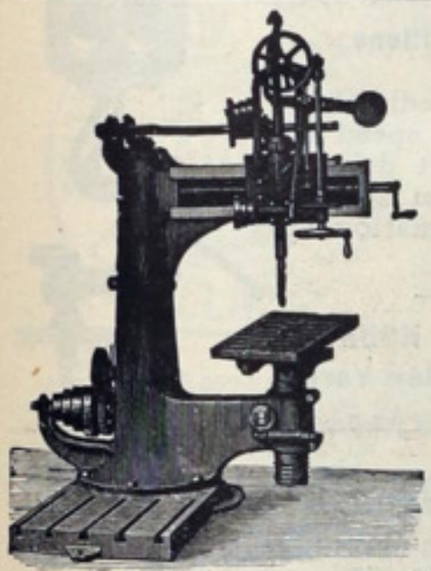

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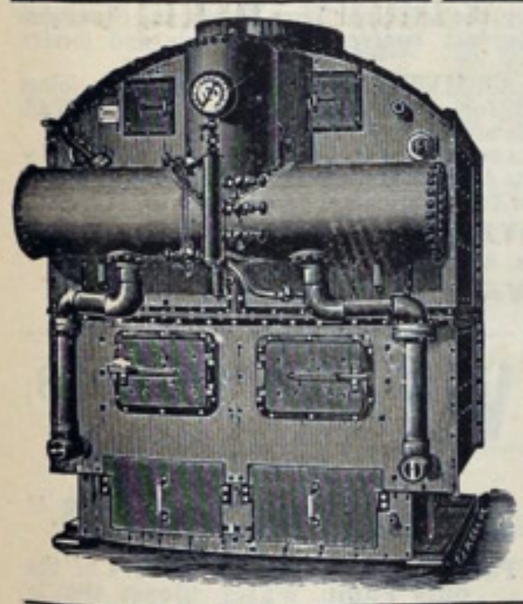

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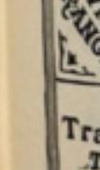

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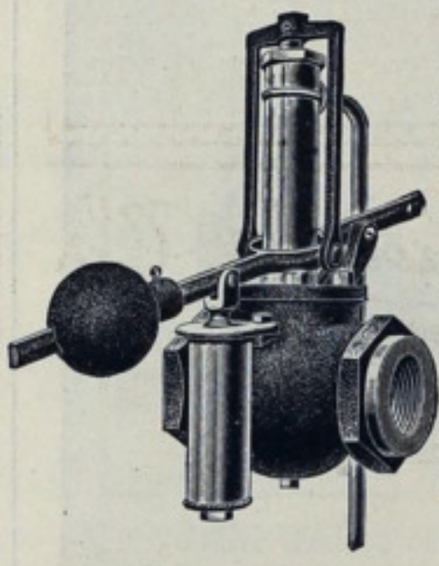

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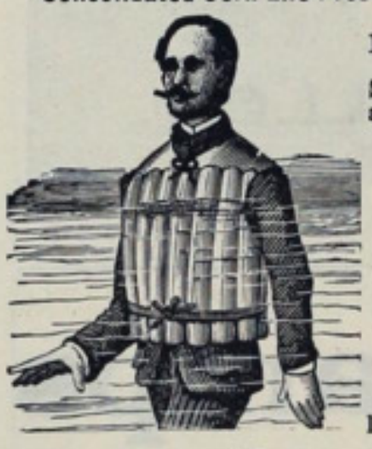

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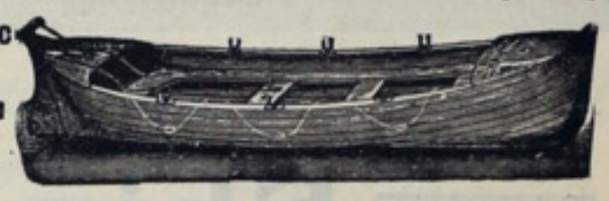

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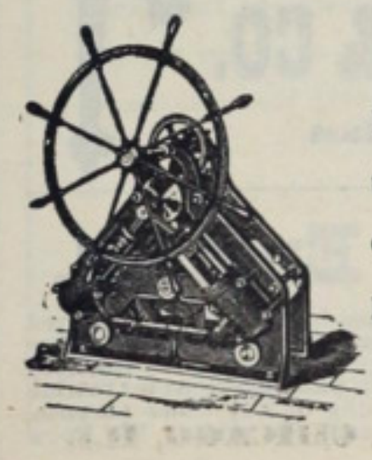

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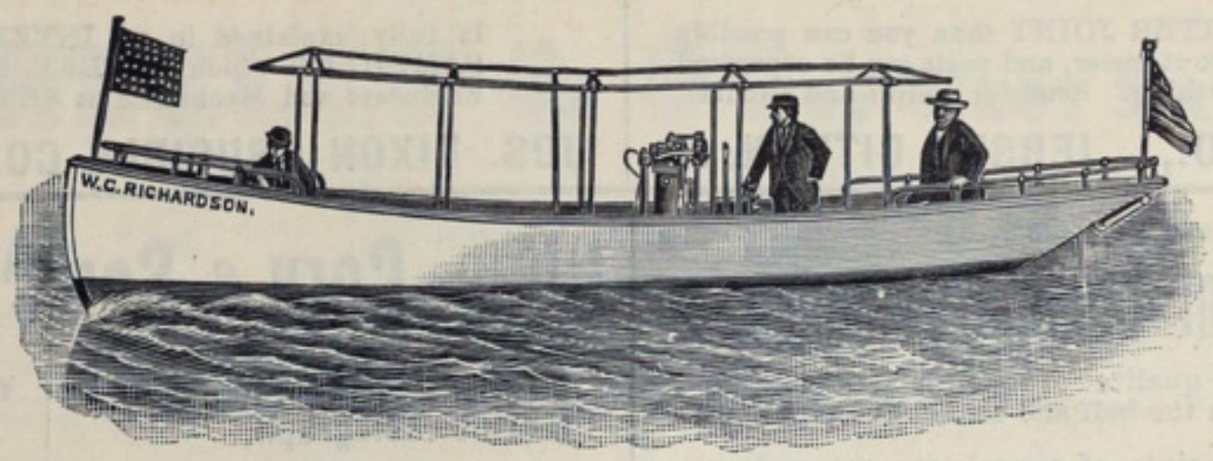

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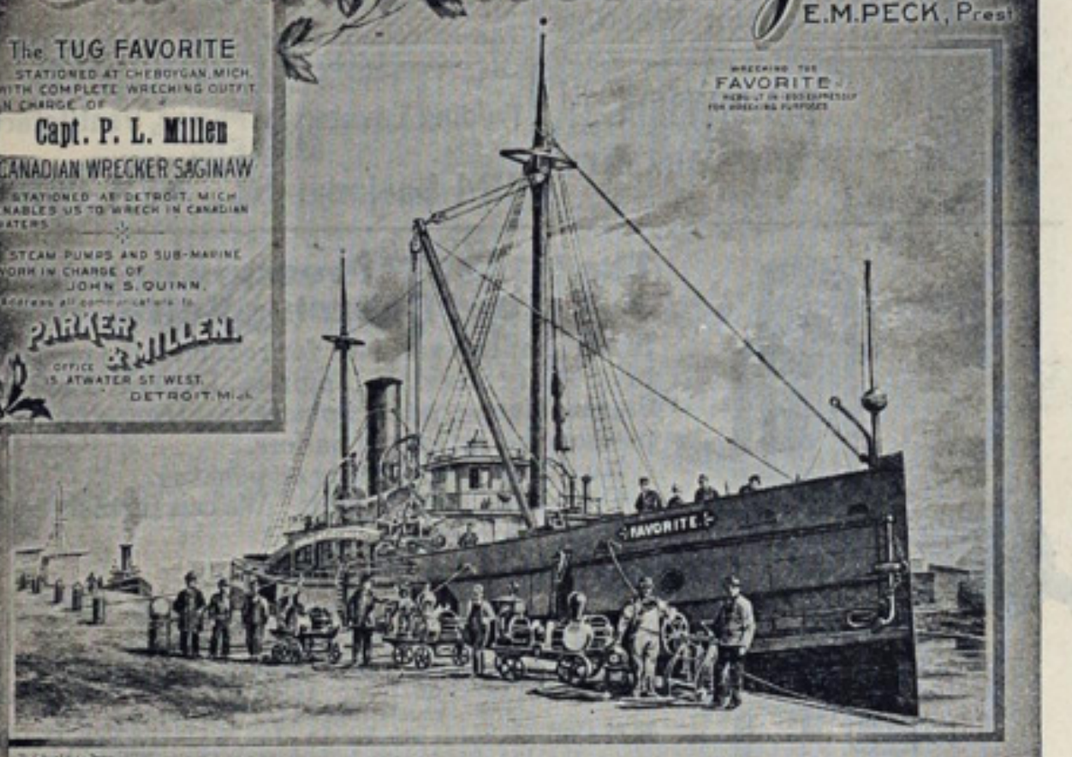

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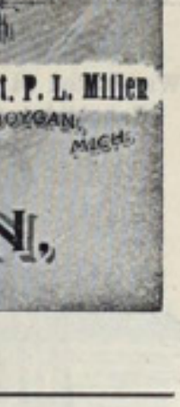

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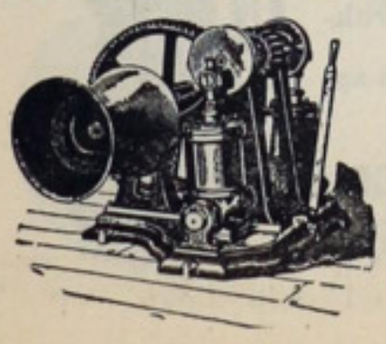

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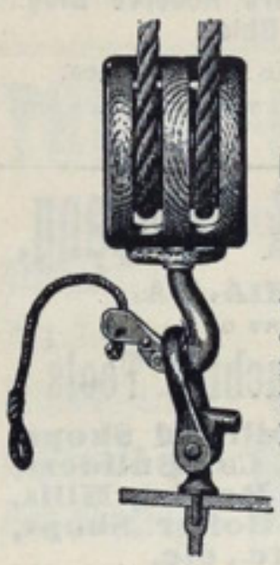

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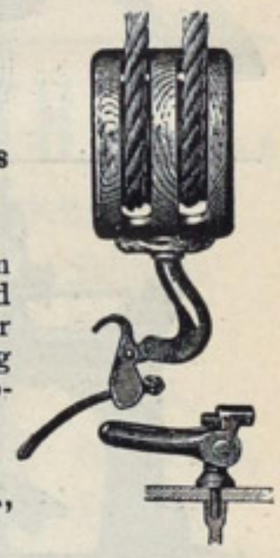

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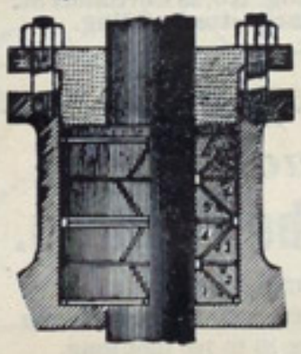

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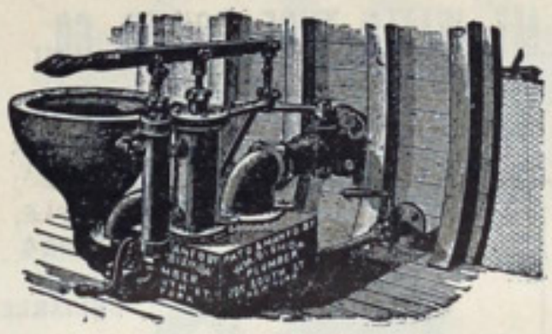

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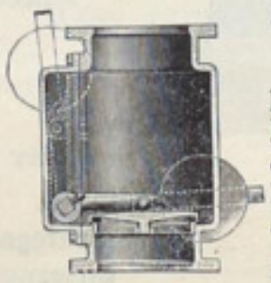

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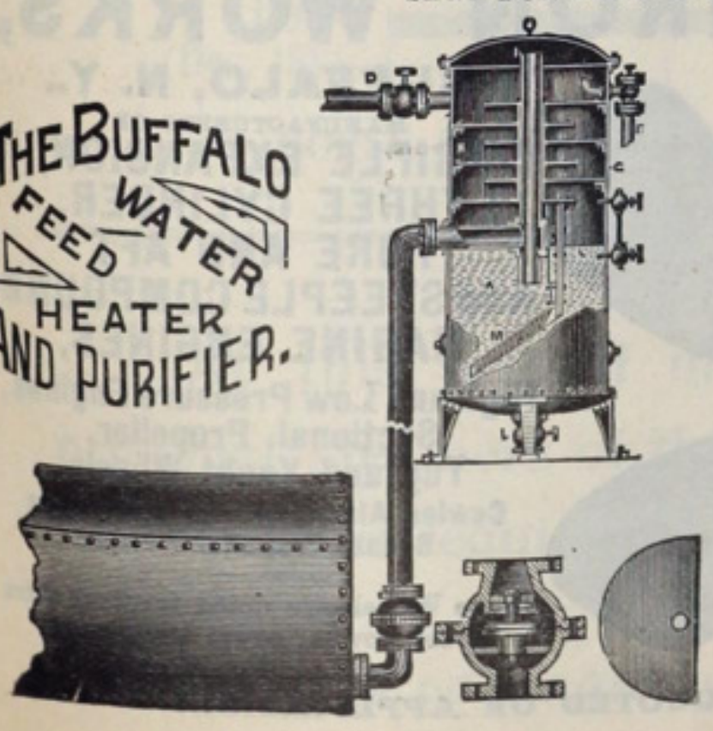

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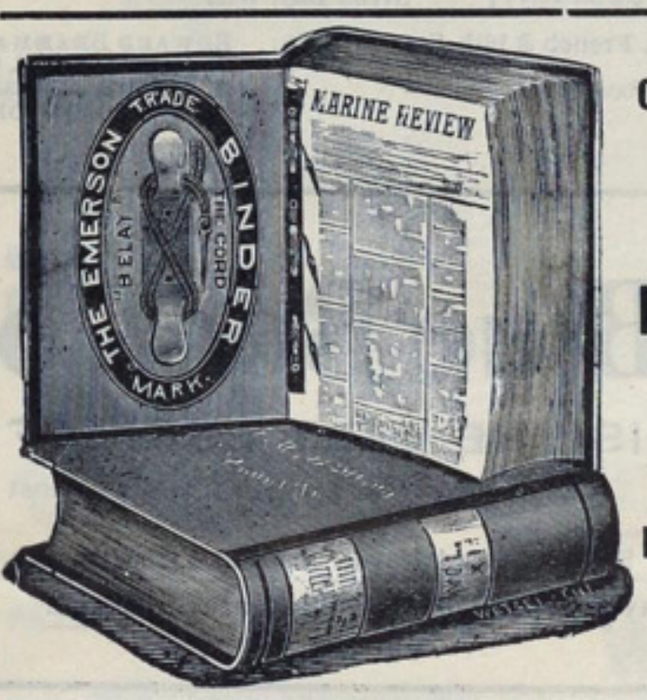

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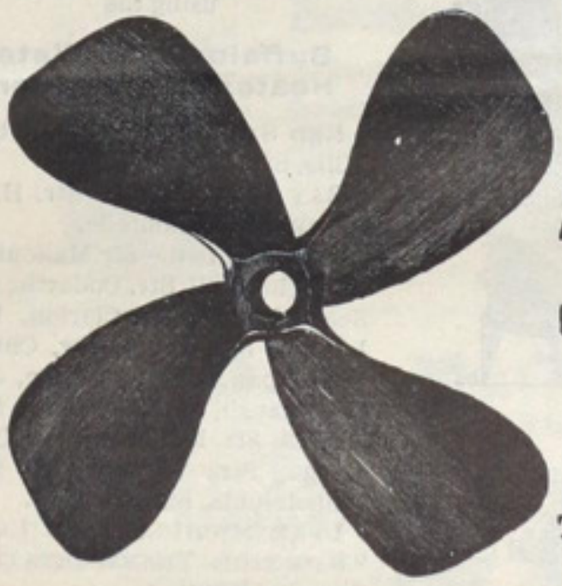

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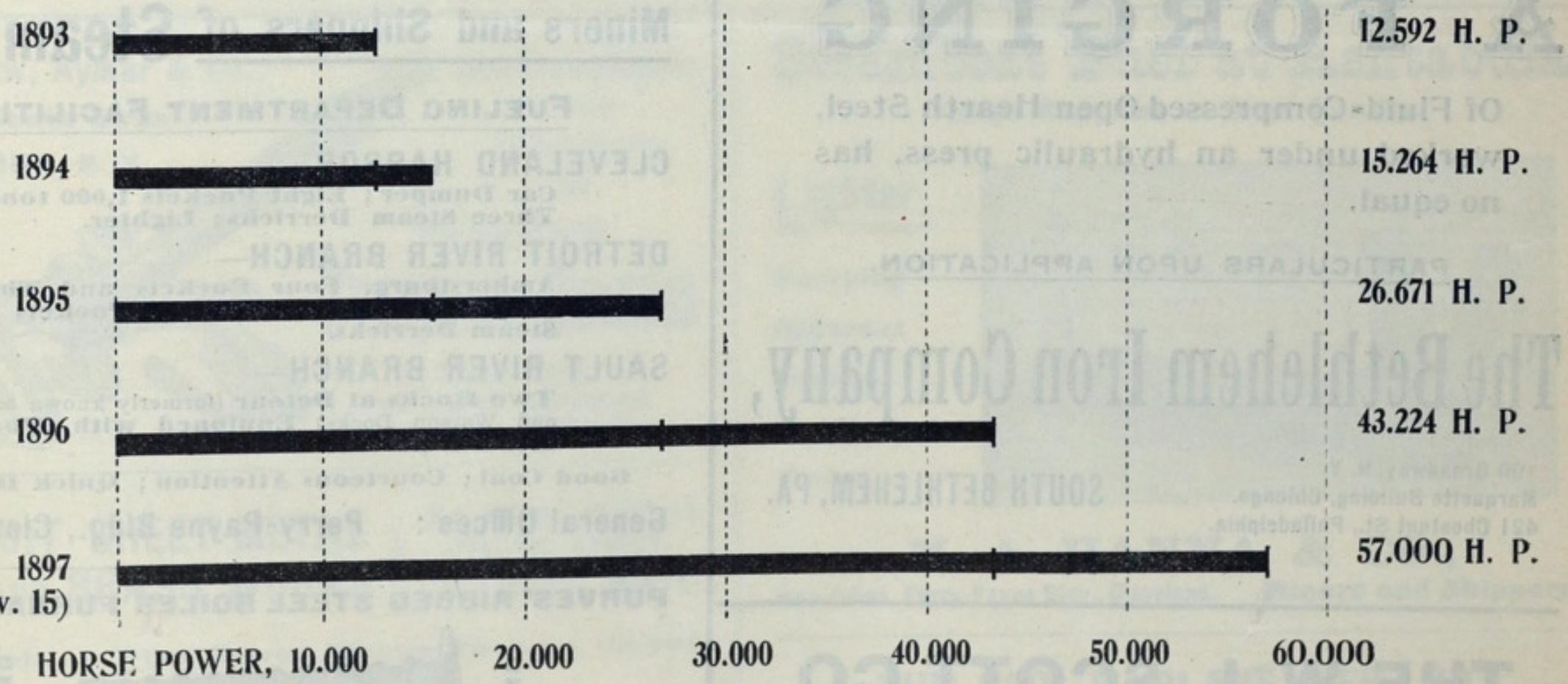

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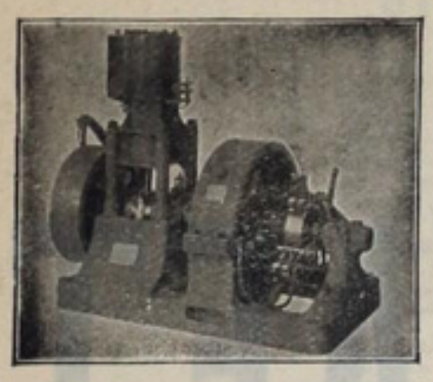

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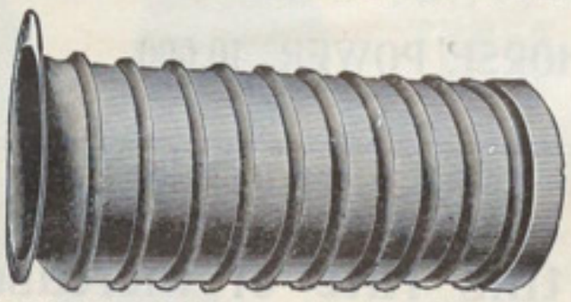

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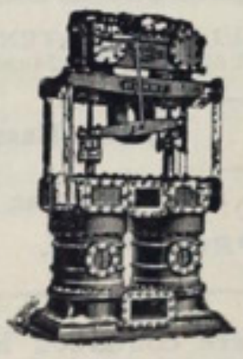
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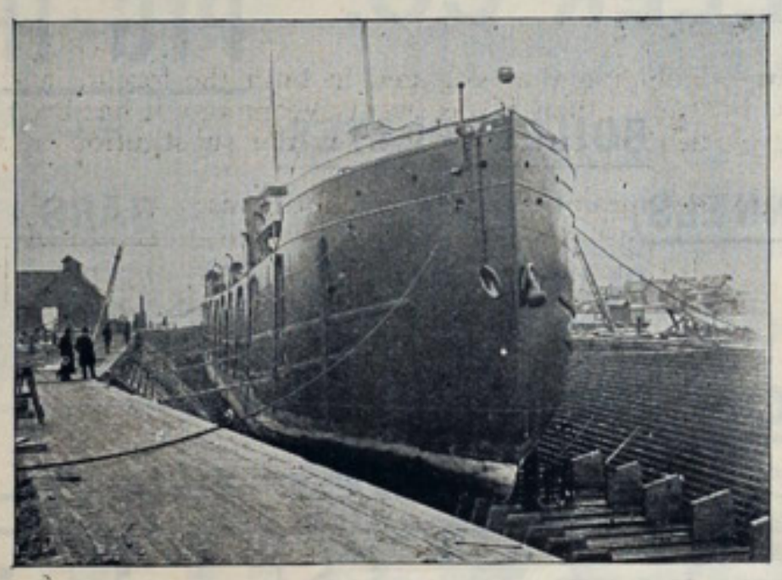

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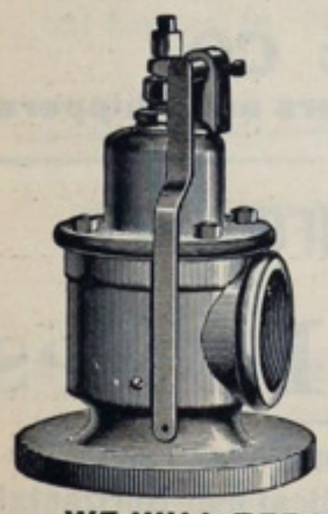

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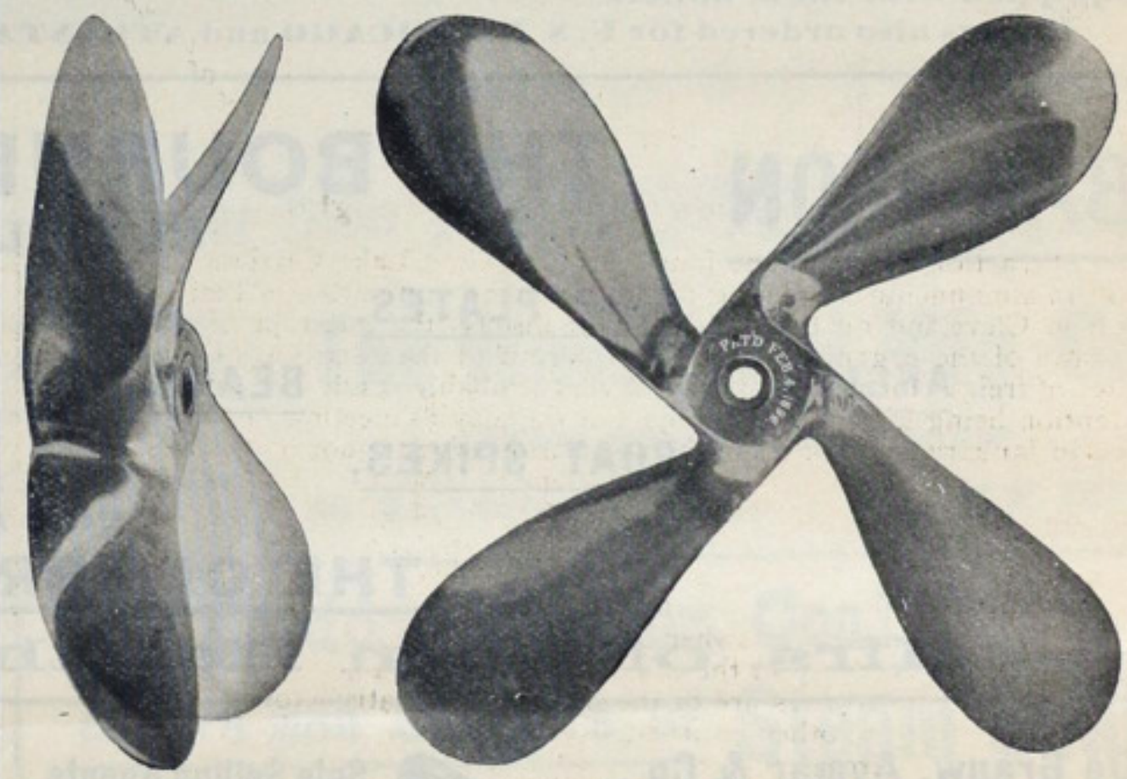

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